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Regional Insect Control Project

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1961 ^{3rd} annual report

1961
RICP
annual
report

31
REGIONAL

INSECT

CONTROL

PROJECT

United States Department of Agriculture*

U.S. Agricultural Research Service,

Plant Pest Control Division

in special agreement with

Agency for International Development, ^

Washington, D. C.

Region Headquarters
Beirut, Lebanon

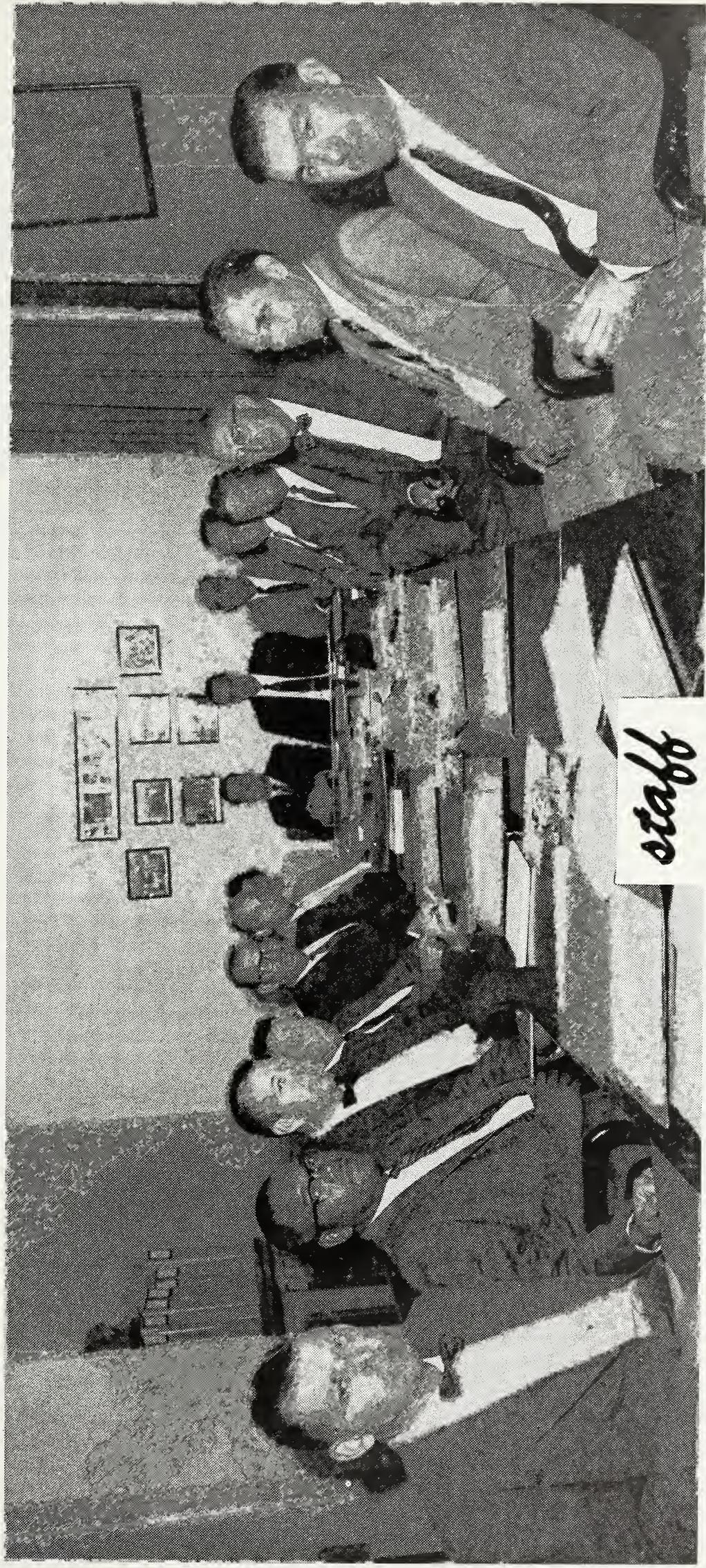
Regional Insect Control Project Annual Report 1961

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REGIONAL INSECT CONTROL PROJECT
PERSONNEL 1961

Staffing	Name	Remarks
<u>Washington, D.C.</u>		
Asst. to Dir. Foreign Tech. Programs, PPCD, ARS Secretary	Edson J. Hambleton Beatrice L. McCormick	
<u>Beirut, Lebanon</u>		
Coordinator	Roland Q. Gardenhire	
Deputy Coordinator	George T. Brooks	1/1 - 3/1
Survey Spec. & Dep. Coord.	Joseph W. Gentry	3/13 - 12/31
Reg. Pl. Quar. Specialist	Frederic P. Hubert	1/1 - 9/23
Entomologist	Vacancy	
Administrative Asst.	Mary M. Eiker	
Secretary	Lisa Katmerian	9/18 - 12/31
Secretary	Ann Secord	1/1 - 7/14
<u>Kabul, Afghanistan</u>		
Entomologist	Edward R. Millet	
<u>Addis Ababa, Ethiopia</u>		
Entomologist	Willis C. Kurtz	
Entomologist	Vacancy	
Chief Pilot	Charles D. Klessig	11/1 - 12/31
Pilot	Charles A. Temple	6/10 - 12/31
Pilot	Glenn G. Grobe	1/1 - 8/20
<u>Tehran, Iran</u>		
Entomologist	Robert L. Linkfield	1/1 - 5/25
Entomologist	George T. Brooks	3/1 - 12/31
Pilot	Calvin C. Franklin	10/9 - 12/31
<u>Tripoli, Libya</u>		
Entomologist	George E. Cavin	1/1 - 8/2
Entomologist	Robert L. Linkfield	8/30 - 12/31
Pilot	Donald M. Kjos	
<u>Rabat, Morocco</u>		
Entomologist	George E. Cavin	10/9 - 12/31
<u>Khartoum, Sudan</u>		
Entomologist	Arthur Kaatz	
Pilot	James J. Faircloth	3/8 - 6/6
Pilot	Robert D. Fenno	L/A Appt. 7/23 - 9/21
<u>Tunis, Tunisia</u>		
Entomologist	Joseph W. Gentry	1/1 - 3/13
<u>Ankara, Turkey</u>		
Entomologist	Flournoy M. Philips	9/1 - 12/31



Left to right

Philips
Brooks
Franklin
Cavin
Millet
Kaatz

Eiker
Gentry
Gardenhire

Hambleton
Linkfield
Temple

Kurtz
Klessig
Kjos

Regional Insect Control Project

SUMMARY OF ACTIVITIES 1961

Introduction

One of the principal concerns of the Regional Insect Control Project during the year was an increase of activities in Africa. In line with this, considerable effort was devoted to planning for expansion of assistance in locust control in areas south of the Sahara. In addition to participating in locust control in the Middle East and Africa, RICP furnished technical assistance in insect survey, plant quarantine, biological control, aerial spray operations and other special fields. The governments also received advice and assistance in many other phases of plant pest control. A total of 20 countries of the region received RICP services in 1961, although assistance to some of the countries was limited. Entomologists were stationed in eight and pilots in four of these countries during the year. Major temporary duty assignments included a short review of the entomology program in Nepal by the Entomologist from Iran (Brooks). Temporary assignments on survey, quarantine and locust control are covered elsewhere in this summary.

In all instances of assistance, the activities of the regional project were integrated with those of each U.S. Operations Mission, and each RICP technician endeavored to work within the framework of his respective Mission. All requests for RICP assistance from the various governments or USOM's received prompt and careful attention.

Desert Locust Situation and Control

Desert locust infestations throughout the invasion region were characterized by unusually heavy invasions in India and Pakistan, near normal infestations in most other areas and very light or no locust populations in the countries of North and West Africa. RICP spray planes participated in a campaign against pink swarms in Eastern Ethiopia in which it was estimated that 150 to 200 square miles of locust swarms were destroyed. The Coordinator made a study of the locust control organization in the Somalia Republic during the year with the consideration as to how it could be strengthened through U.S. assistance. He also spent two weeks in Jordan advising on the locust control program. The Entomologist from Libya (Cavin) made an appraisal of locust control activities in Ethiopia during the summer. Near the end of the year he also investigated a threatening locust situation in Trucial States area following a request for assistance from the United Kingdom.

Mr. Arthur Geiser, Assistant Chief Staff Officer, Methods Improvement Operations, Plant Pest Control Division, Beltsville, Md., spent several days in Ethiopia reviewing and advising on locust control procedures. His trip to the area also included observations of British locust control methods in East Africa.

Country Program Highlights

Although each RICP Entomologist is responsible for a broad program of plant protection within his particular Country, he approaches his work on a priority basis. During 1961 some of the primary areas of concentration in each country were as follows. A country-wide survey was conducted in Afghanistan to determine the kind and relative importance of agricultural insects. Plant protection organization and administration problems were explored in Iran. Aerial control demonstrations and lure testing programs were initiated against Mediterranean fruit fly and olive fruit fly in Libya. A central crop protection organization, utilizing refined survey and control methods, was placed in operation to direct control of cotton insects in Sudan. The important locust outbreak in the Railway Area of Ethiopia and other locust activities required the most attention in that country. (In Turkey and Morocco the Entomologists did not arrive at post until late in the year.)

Plant Quarantine

The RICP Plant Quarantine Program, which has been under direction of a specialist for the past five years, has made a significant contribution to plant protection in Southwest Asia and Africa. CENTO has relied upon the Specialist to develop the plant quarantine aspect of its economic development program. Developments at the Second CENTO Plant Quarantine-Customs Meeting held in May showed that encouraging progress was being made in CENTO countries in the plant quarantine field. During 1961 special attention was devoted to CENTO requirements, a review of the Turkish Plant Quarantine Service, and an evaluation of fumigation requirement for exports and imports in the Sudan.

Insect Survey

With addition of a Survey Specialist to the staff insect pest survey activities were intensified throughout the region during the year. Special detection and appraisal surveys together with training and advisory sessions were conducted in Afghanistan and Ethiopia. This work will provide a more sound basis for developing quarantine and control programs in these countries. The surveys also resulted in collection of several hundred specimens of harmful insects which will be placed, after authoritative determination, in reference collections within the countries. Duplicates have been sent to the U.S. National Museum for use of U.S. plant protection agencies. To supplement insect identification services afforded by U.S. Federal taxonomists, attempts to secure assistance from entomological agencies in United Kingdom and France were initiated with some success. A compilation of the agricultural insects of the RICP area was also undertaken.

African Insect Control Services Seminar

The First African Insect Control Services Seminar, which was sponsored by ICA, was held in Tunis, Tunisia January 25 - February 3, 1961.

RICP, principally through its Deputy Coordinator (Brooks), provided organization, leadership and technical direction of the Seminar. Several other project members also actively participated. USOM/Tunisia was host of the meeting and provided administrative support. Delegates and advisors from eight African countries (Libya, Tunisia, Morocco, Ghana, Kenya, Tanganyika, Ethiopia, Sudan) attended the Seminar. The agenda was designed to cover the broad needs of these developing nations in plant protection organization and operations. The interest and enthusiasm of the group throughout the sessions emphasized the value of such an undertaking.

RICP Opens in Morocco, Closes in Tunisia

A request for services of an RICP Entomologist by the Government of Morocco through USOM/M was granted in May. The Entomologist position in Tunisia was transferred to Morocco at this time. The Tunisia position had been closed out earlier in the year when the Entomologist was transferred to Beirut. The Entomologist assigned to Morocco arrived at post in Rabat in early October.

Attendance Meetings and Conferences - 1961

FAO:

Technical Advisory Committee for Desert Locust Control, Rome, January (Hambleton, Coordinator, Entomologists from Libya and Sudan*). East African Desert Locust Control Sub-committee, Addis Ababa, October (Coordinator). Sunn (Senn) Pest Meeting, Tel-Amara, Lebanon, September (Deputy Coordinator). Middle East Plant Protection Meeting, Damascus, September (Pl. Quarantine Specialist). Future Locust Control in East Africa (FAO and U.K. Meeting), Rome, June (Coordinator). U. N. Special Fund Locust Project (Specialists Meeting), London, December (Coordinator).

ICA:

African Insect Control Services Seminar, Tunis, January-February (Hambleton, Coordinator, Deputy Coordinator, P.Q. Specialist, all RICP Entomologists for Africa, RICP Pilot from Libya). Food and Agriculture Officers' Conferences, Nairobi and Tehran, April (Coordinator).

Other:

Control Citrus Pests of Mediterranean Area, Nicosia, January (Entomologist from Tunisia*). RICP Annual Conference and AFE Program Planning Meeting, Beirut, November-December (Staff (Asia Country Personnel not included AFE meeting)).

* Advisor to Country Delegation.

Regional Insect Control Project

SUMMARY OF ACCOMPLISHMENTS 1961

During 1961, the 17 technicians of the regional staff serviced 20 different countries of the Middle East and Africa and participated in

11 international meetings and held
30 training sessions reaching
1,090 plant protection personnel. In addition pilot-
mechanic training was given to
30 participants.
16 participant trainees were selected for training in
U.S. or in programs outside their country. A total of
79 aerial and ground demonstrations were made against over
50 pests on
64,377 trees,
4,522 acres of crops and on
36 tons of grain. Regional spray planes applied
6,175 gallons of spray concentrate to control desert locust.
Survey activities resulted in collection of over
500 lots of economic insects.

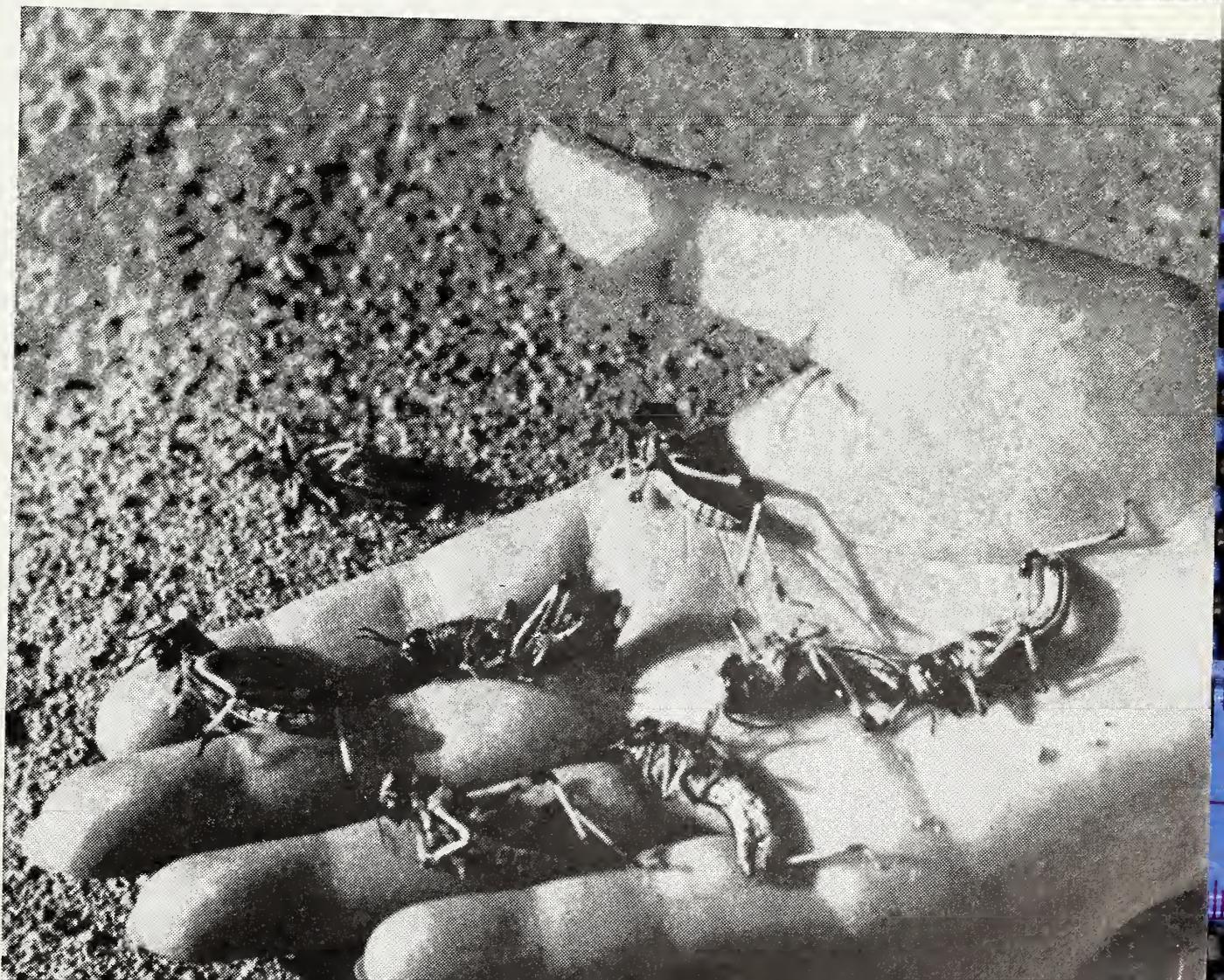
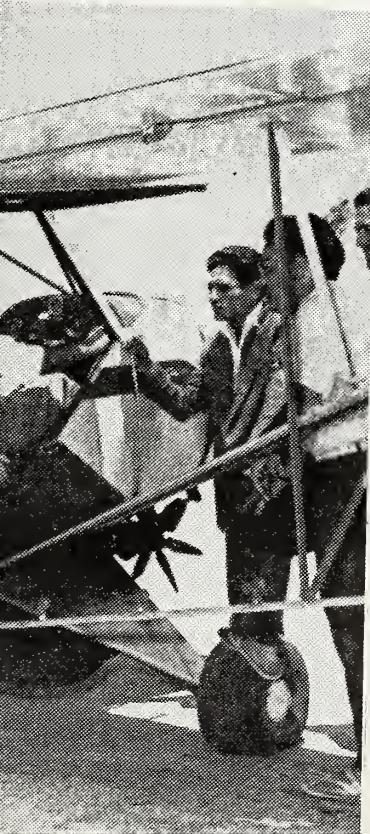
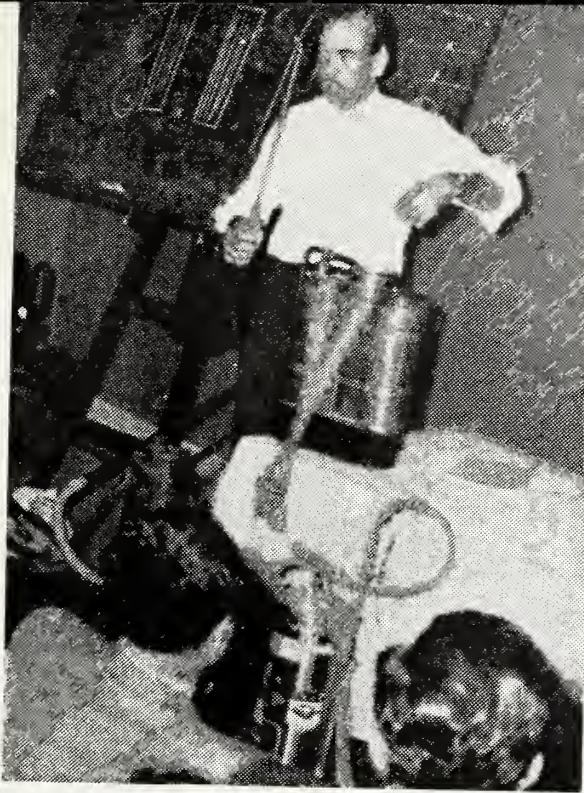
This resulted in the importation during the year by countries with RICP programs of

20 spray planes
54 vehicles,
2,822 power applicators,
1,123 hand applicators, and approximately
2,042 tons of pesticides from the U.S. and
15,595 tons from other sources.

This work was supported by

\$ 532,893 of USOM money*,
377,000 Regional Insect Control funds and
12,223,288 Government plant protection expenditures. Thus making
approximately
13.44 dollars local money equivalent used for each U.S. \$1.00
expended.

* Excluding loans.



projects

REGIONAL INSECT CONTROL PROJECT - 1961

AFGHANISTAN

E.R. Millet

Program Planning

As there had been no RICP Entomologist stationed in Afghanistan in 1960 until October, it was necessary to draw up and sign a new special agreement between USOM/A and RICP for the 2-year period from July 1, 1960 to June 30, 1962. The agreement for the previous 2-year period was revised with some changes to meet the present program commitments and was signed in February 1961 by the Mission Director and the Entomologist assigned to Afghanistan.

It was also necessary to draw up a Work Plan for Insect Pest Control for 1961 between the Plant Protection Department of the Ministry, the Mission, and RICP. The 1958 plan was revised to include tests and demonstrations against five major pests of economic importance to Afghanistan's agriculture: desert locust, almond webworm, senn ~~pest~~, citrus whitefly, and grasshoppers. Other activities in the plan called for survey for and demonstrations of control for aphids, codling moth and bollworms, and for the Ministry to organize and move out of its warehouse and into the hands of extension workers and farmers, for demonstration and use, as much pesticide, equipment, and material as was possible and practical. This plan was signed in March by the Minister of Agriculture, the Mission Director, and the RICP Entomologist.

During mid-February an Agricultural Conference was held and attended by all American agricultural technicians in Afghanistan. Highlights of the conference of interest to RICP were recommendations by the crop committee, of which the Entomologist was a member, that a survey be made in Afghanistan to determine definitely the most important economic insect pests, their extent of damage, distribution, and possible control; and to work towards getting all pest control equipment and pesticides out of the Ministry warehouse to the extension workers and farmers.

Budget

For FY 62, the Plant Protection budget was set at \$10,000 U.S. for the project plus about \$15,500 of PL-480 wheat money in local currency. The regular Ministry Plant Protection budget is about \$125,000. The \$10,000 U.S. has been PIO/C'd for about \$6,500 in equipment, consisting mostly of hand-spray equipment, wheelbarrow sprayers, and some small portable power equipment; \$500 in laboratory and survey equipment; and \$3,000 for insecticides. PIO/P's are also

being considered for two participants for special one-year training in the States, and one participant for two years in West Germany in the early spring of 1962. These funds have not yet been approved.

Ministry Program Notes

The new Plant Protection Laboratory and Office Building, financed mostly with FY 61 PL-480 Wheat Funds, was completed in the early summer, but apparently due to the lack of installation of electricity, occupancy was delayed until the end of the year.

During the year two Russian technicians were assigned to the Plant Protection Department. One is stationed in Jalalabad and is conducting research and study on the pink and spiny bollworms and other cotton insects in general. The other is stationed in Kabul and is making a study of plant quarantine problems in order to formulate laws and regulations for this activity and to set up quarantine stations, possibly at border points and airports.

Survey

A survey was begun in March and continued through the spring, summer, and fall seasons. Practically all of the important agricultural areas of Afghanistan were covered with the exception of parts of Kataghan Province and none of Badakshan Province. The Survey Specialist from the Beirut Office spent three weeks with the Entomologist during the summer, and at that time the survey was intensified in the areas of Kabul, Jalalabad, and the Helmand Valley. A total of 302 collections was submitted to the U. S. Department of Agriculture in Washington for identification. Returns have been received on 232 collections, and 70 are still being awaited at the close of the year. The important finds are discussed in the Insect Condition Summary for Afghanistan.

Control Demonstrations

Demonstrations were limited and, although the Work Plan was not adhered to, some demonstrations were conducted in conjunction with training, research and technical support to other agricultural technicians. There were no desert locusts in Afghanistan during 1961, but there were some isolated damage spots from local grasshoppers. The senn pest population was too low to merit tests and demonstrations, and the Russians had only two weeks of activities on Italian and Moroccan locust control in the north.

Training

Training sessions were conducted during the year. These consisted chiefly of lectures, in short courses to extension workers and farmers, on fruit, cotton, and sugar beet insect control. Assistance was given the Survey Specialist in two days of lecture sessions

on survey and detection of insects to Plant Protection and Extension Agents. A laboratory period of the same lectures was also given to the senior class of Kabul University. On-the-job training of spraying against fruit flies and weevils in cucurbits, and soil treatment of nursery stock, was given to extension and plant protection workers.

Equipment and Supplies

A check was made of plant protection needs in the provinces and some equipment and several tons of insecticides were moved from the central warehouse in Kabul to provincial centers at Maimana, Jalalabad, and Kandahar. The plant protection centers at Herat and Baghlan were adequately equipped for what they could handle this year at the time checked.

The equipment ordered with FY 61 funds, consisting chiefly of a micropulverizing machine to prepare talc for dust formulations, two work jeeps and two Buffalo turbine blowers, a Hudson sprayer for tractor mounting, and a Hudson multiple-outlet duster for tractor mounting, have all been shipped from the States but have not yet arrived in Afghanistan. Some twenty text and technical books on applied entomology and plant disease control, for transfer to the Afghan Plant Protection Laboratory Library for reference use, were also ordered during the year. These have been received.

Advisory and Other Duties

Approximately 100 work days were spent on field trips and time in the field in the country during 1961. This represents over 30 percent of the total work time during the year. These field trips were mainly in conjunction with survey activities, and involved contacts with Provincial Directors of Agriculture and plant protection and extension workers stationed in the provinces. The contacts were relative to consultations, programs, needs for plant pest activities and control, and general advisory work. Approximately one month's time was spent in insect control and clean-up of 7500 tons PL-480 wheat.

REGIONAL INSECT CONTROL PROJECT - 1961

ETHIOPIA

W.C. Kurtz
C.D. Klessig
C.A. Temple

Administration

The Pest Control Project bookkeeping was taken over by the main Joint Agricultural Business Office as of March 1, 1961. The 1961 (Eth. 1953) budget was not approved until Feb. 1961, making operation difficult. Field trips had to be cancelled due to lack of gasoline. A budget for 1962 was prepared in two parts, July-Sept., 1961 and Oct. 1 to Dec. 31, 1962. This necessitated reworking a previous budget prepared for just the 1962 fiscal year.

Locust Control

During June of this year one of the heaviest infestations of desert locust (Schistocerca gregaria) was experienced in the Railway Area, according to the British Desert Locust Control Organization. The infestation during the hopper stage was not considered serious and reports and observations indicated that the infested area, extending from Dire Dawa to Awash, was in small scattered bands, and apparently being adequately treated by ground units. The subsequent invasion of fledglings was unexpected and difficult to combat. They were first observed in quantity south of Awash on June 15 and spraying was immediately begun. By June 29 the two RICP planes put out 6,175 U.S. gallons of BHC 16 percent gamma spray concentrate. The DLS (British Desert Locust Survey), also working in this area, had three Beaver airplanes for spraying and one Cessna 180 for reconnaissance. A total of about 11,000 Imperial gallons of BHC was applied by DLS and RICP planes. Due to inadequate reporting service, it was not known where the breeding of the heavy fledgling population took place.

RICP Pilot Temple had an accident due to a sudden downdraft while spraying in the hills June 29. Fortunately, he sustained only minor injuries, but the plane was a total loss except for parts that were salvaged. Cooperation between the Ethiopian, DLS and RICP organizations was excellent during this emergency and during the entire campaign, with all working as a single team. Actually, the effective control program would not have been possible without DLS assistance.

During the campaign RICP Entomologist Cavin from Libya and the RICP Coordinator from Beirut, made observations in the area. Both were impressed with the fine cooperation of all organizations participat-

ing and with the magnitude and difficulties of control operations in Ethiopia. This experience will be of benefit in planning further RICP operations in this part of Africa.

Preparations were made for the summer campaign in August, September and October in northern Ethiopia. The Ministry had about 10,000 I.G. of BHC 16 percent gamma in Addis and Asmara and the DLS sent another 10-20 thousand gallons to Asmara for aircraft work. However, aerial reconnaissance did not disclose any sizeable swarm movements or hopper infestation and Ministry of Agriculture ground units were able to cope with the situation.

Mr. Archie Geiser, Methods Improvement Specialist, PPCD, USDA, Beltsville, Md., visited Ethiopia in October for the purpose of observing control operation. This was not possible due to the light infestation; however, he held valuable discussions with the Coordinator and Ethiopian RICP personnel concerning future operations in the area.

Other Insect Control

As many insect control demonstrations as possible were made to acquaint the farmers, landlords and government officials with the need and value of insect control. Also this provides on-the-job type training for Ministry personnel. Most of the demonstrations were made by the technician trainees. Close cooperation is maintained with the Imperial Agricultural College at Alemaya and the Jimma Secondary Agricultural School at Jimma, and other agencies such as FAO.

Considerable attention was focused in 1961 on tempsh or nutgrass armyworm (Spodoptera exempta) control. Many demonstrations have been carried on by the trainees. It has been found that a dosage of 1 pound actual DDT per acre is effective. Many farmers have bought DDT and are applying it themselves. The trainees also sprayed cotton in the Gibe River Valley for the control of a leaf-hopper and found that $\frac{1}{2}$ pound of actual malathion per acre is effective at a cost of Eth. \$1.75 per acre for the insecticide.

Knapsack sprayers are issued to the Extension Agents for loan to the farmers with the understanding that they must eventually get their own application equipment which is available in Addis. Farmers are also buying insecticides for the control of other insects. DDT and malathion has been furnished the Extension Agents for sale to the farmers. Malathion has been put up in 4 oz. bottles to sell for Eth. \$1.00 as some farmers cannot afford to buy large quantities. The Extension Agents have been well trained and are beginning to come to the Pest Control Project for assistance with their insect and disease control problems.

A representative of Shell Chemical Co. is making a survey of insect problems, particularly on cotton, to determine if it would be feasible to do some commercial aircraft spraying. He is also interested in setting up a formulating plant in Ethiopia if practicable. The Mitchell Cotts Co. (Red Sea) Ltd. is developing a cotton scheme in the Danakil area utilizing the Awash River. Another large cotton scheme is being developed north of Massawa in Eritrea. This will depend upon rainfall. At this time cotton would be the only commercial crop of enough acreage to treat economically by aircraft.

A talc grinding mill was located in Asmara which is reportedly capable of producing 5,000 quintals (1,000,000 lbs.) of talc a month. Some thought has been given to the greater use of dusts in Ethiopia as this would eliminate the use of mechanical equipment by the small farmer who does not yet know how to maintain the simplest of equipment. The Ministry Locust Control Section uses several tons of dust each year for making poisoned bait and dusting. This local source of talc may afford a good basis for initiation of pesticide formulation in Ethiopia.

Five hundred pounds of premium grade malathion dust has been obtained for experimental stored grain protection.

About 500 pounds of J&J rat bait has been obtained for trials against field rats, a major problem in Ethiopia.

Quarantine

The Ministry issues phytosanitary certificates for exports, primarily small grains. However, until the proposed basic plant pest control laws are enacted and trained quarantine inspectors are available, this service will not be effective. Because of delay in utilizing the funds set up for the construction of two fumigation chambers, the money was deobligated. Funds have been included in the proposed budget for next year for the construction of these chambers.

Insect Surveys

The RICP Survey Specialist spent three weeks in October making insect surveys and sent in 139 collections to Washington for determination. His assistance here was greatly appreciated and it is hoped that he can return at a later date when traveling is better and other insects are present. Because of the widespread prevalence of the cottony cushion scale (Icerya purchasi) the Survey Specialist has proposed introducing the vedalia beetle and establishing colonies at strategic locations. This was done some years ago in Eritrea.

Training

Ato Yosef Bushen, participant at the University of Arizona, completed his first year in entomology training satisfactorily and will be returning to the Pest Control Project in February 1962. He will

have a Master's Degree. Ato Andemeskal Woldehaimanot, Ministry entomologist at Asmara, returned from a one-year special training in entomology at the California Polytechnical Institute. He was enthusiastic about his work there and eager to get more accomplished in Ethiopia. On-the-job training is continuing with eight trainees, six employed by the Joint Fund Pest Control Project and two by the Ministry. One Pest Control Project trainee returned from a three-year training period in Germany. He did not return to the Project.

Two Ethiopian Air Force pilots were assigned to the Ministry for pilot training in May, but they were unable to stay. In August two other Air Force personnel were transferred to the Ministry for pilot training and it has been found that one of them will probably develop into a good pilot. The Air Force will continue their salary until they are finished with their training. It was impossible to obtain students for agricultural pilot training from the National Airlines Training Program because the Ethiopian Airlines absorbs all of their graduates.

Aircraft

Piper Cub airplane N1310A, after reconditioning last year, was turned over to the NATP for use in training. Ownership is still maintained by the U.S. Government. Piper Cub N1397A is being reconditioned. Piper Cub N9458D which crashed in the June locust control campaign, was declared beyond repair but many parts were salvaged. Piper Cubs N9855F and N9854F are in good condition. The latter was brought from Khartoum in November. With additional airplanes in Addis it will be necessary to obtain more hangar space. It is possible that space can be obtained at Asmara or Dire Dawa. Two Piper Cub 150 H.P. airplanes complete with radios and spray equipment, purchased by the Ministry of Agriculture, were assembled by RICP pilot Grobe and licensed.

REGIONAL INSECT CONTROL PROJECT - 1961

IRAN

G. T. Brooks
C. C. Franklin

Administration and Organization

As a result of the change in government which took place in late spring 1961, the new Minister of Agriculture has made certain changes in organization, abolishing some positions and combining some of its departments. The Department of Plant Protection remained intact but a new director general was appointed, Eng. Behboudi, who assumed office in October 1961. He has been charged with the responsibility of overhauling the department's structure so as to have a more efficient operation.

One of the major obstacles hindering the spread of modern plant protection techniques in Iran is the almost total absence of an effective instrument for reaching the cultivator. At present this is the responsibility of the Extension Department. Unfortunately, this department has set up its own plant protection staff, completely independent of the Plant Protection Department. For the most part this staff is completely untrained in pest control techniques and has no technical agency from which to draw its information. Since plant protection is believed to be a means of increasing the total agricultural production, it has been recommended that steps be taken whereby the Department of Plant Protection assumes a more active role in servicing the Extension Service. Due to developments in the past, this may not be easy to accomplish. Two proposals are presently under study: (1) That all Extension plant protection specialists be members of the Department of Plant Protection from which they will receive technical guidance and support. Such specialists would be assigned to the Extension Service and would work as an integral part of that unit, or (2) that the Department of Plant Protection assume the responsibility of training and giving technical support and guidance to Extension's plant protection specialists who will be employees of the Extension Service.

Of major importance to the Department of Plant Protection is the redevelopment of its aerial spray program. This subject will be covered more thoroughly in the report on aerial operations by Mr. Franklin.

The research section of the Department is receiving increased attention not only from the GOI but also from USOM/Iran. Recently

Mr. Firouz Taghizadeh has been appointed as Head of the Research Section. Six projects are presently being developed for approval and implementation. It is intended during the next five years to upgrade the activities of this department through training, program planning and implementation, and improved facilities and equipment.

The Minister of Agriculture has expressed interest in reorganizing the government machinery along more efficient lines. The Department of Plant Protection has been indicated as one area for improvement. As yet, plans are not definite and it is much too early to say what form this reorganization will take.

Highlights of Year's Activity

1. Locust infestations, both desert and Moroccan, did not reach heavy proportions this year. Desert locust was limited primarily to the southern ostan of Khuzestan, Fars and Baluchistan. The Moroccan locust was heavy only in the Moghan Plains. In November desert locust activity was increasing in the southern provinces but the extent of the activity was undetermined. The GOI has granted the Department of Plant Protection an advance of 30,000,000 rials from next year's budget to meet any possible developments. This is for internal expenses only.

2. As part of the effort to revitalize the olive industry the Department of Plant Protection sprayed approximately one third of the olive trees (approximately 300,000 trees) in the Rudbar area against Saissetia oleae. This operation was partly financed through the U.S. Food for Peace Program by paying the laborers involved half their salary in wheat.

3. Over 1,000,000 citrus trees were sprayed in the Caspian area. All costs were met by the cultivators with technical direction and guidance being given by the Department of Plant Protection.

4. In May of this year CENTO sponsored a Plant Quarantine Seminar in Turkey. Two Iranian participants were sent to the conference.

5. In May, June and July FAO conducted a Senn Pest Control Training Program. This program was developed and conducted in the U.S.S.R. Two delegates from the Department of Plant Protection participated.

6. One participant has been sent to the States for training in entomology.

7. Two entomologists from the U.S.S.R. visited Iran in September for observations of the GOI plant protection program. Offers of assistance were made. More details on this visit are not available.

Aerial Operations

If the present aerial operations are to be made efficient and if allowance is to be made for future growth, it is necessary that a separate and permanent airport be established for the plant protection aerial spray unit. The Ministry of Agriculture at this time has suitable land which has been surveyed for this purpose. Three hangars are on hand and ready to be erected. The main obstacle to this project is the local Air Traffic Control which has set up a twenty-five mile radius control zone around Mehrabad, Tehran's international airport. It is proposed that all air traffic in this zone be controlled under instrument flight rules regardless of the weather. The Ministry of Agriculture's land for the airport is at Karaj which is sixteen and a half miles from Mehrabad. A meeting has been called of all concerned in an effort to obtain an exception for the spray unit based on low altitude.

Registration of Plant Protection's aircraft at this time is with the Air Force. It is felt that this must remain for a number of years as none of the pilots or mechanics have civilian license with proper ratings to operate under civil registration. Through future training and raising of standards, these licenses may be attained.

The government hopes to have fifty operating spray planes in five years. It is planned that we try to select and train ten to twelve new pilots each year. Lack of mechanic training in specific fields is an acute need. Training facilities at Pakistan have been offered by the Government of Pakistan, and will be investigated with the idea of establishing a permanent channel for training and to allow for the time when no RICP Advisor is available. The Government of Pakistan has offered to train mechanics at the existing facilities of Pakistan International Airways.

It was recommended and approved that a pilot flying refresher course and a ground school course in navigation be started. These two courses are now under way.

Proposed training programs are as follows: English for all technical personnel (as English is the universal language of aviation), specialized training in Pakistan for mechanics, training of spray pilots with private license (a number of these pilots may be available from a local civil aviation club school), and mechanic training for pilots.

Problems and projects which will require attention are:

1. Establishment of letter of credit or other means in advance of need for use in ordering parts, etc. from other countries.
2. An incentive program to retain trained personnel now employed (pay, uniforms, insurance, retirement etc.)
3. Better personnel supervision.
4. Spare parts inventory to facilitate better ordering practice.
5. Utilization of old and wrecked parts.
6. Aircraft dispersal to give better protection to a wider range of crops.

REGIONAL INSECT CONTROL PROJECT - 1961

LIBYA

Robert L. Linkfield*
Donald M. Kjos

Administration and Organization

The Economic Council of the Libyan Government has approved the Plant Protection work plans for 1961. This is the first year that Plant Protection has had a permanent budget. The budget will cover work in Tripolitania, Cyrenaica, Fezzan and the Federal Government.

During the year a special agreement between the USOM/Libya and the Regional Insect Control Project was approved and signed by both parties. Copies of the Special Agreement were distributed to those concerned.

The Tripolitania Plant Protection Section has added three new trainees to the staff; one of the trainees has resigned, but the remaining two are doing quite well. It is hoped that at the completion of their training they will be placed in survey and plant quarantine activities.

Survey and Control

The Egyptian cottonworm (Prodenia litura), the olive fly (Dacus oleae) and the Mediterranean fruit fly (Ceratitis capitata) were the three main insect pests in 1961.

Mediterranean fruit fly lure testing was initiated in apricot orchards May 2. This work was done at the request of the ARS Entomology Research Division who supplied the test material. Five lures were tested using Steiner and McPhail traps, and five tests were conducted. Chemical No. 30992 seemed to be the most promising. Results of the trials have been forwarded to Beltsville, Md. for further evaluation. Similar testing of lures for olive fly has been initiated.

Airplane spray demonstrations were initiated this year against the olive fly (Dacus oleae) and the Mediterranean fruit fly (Ceratitis capitata). Aerial demonstrations also included alfalfa weevil and blue mold of tobacco. Including repeated applications, 699 acres (including 47,614 trees) were treated and 2,066 gallons of mixed chemicals were put out.

* The majority of the activities reported here were carried out by G.E. Cavin who left this post August 3, 1961 for a new assignment with RICP.

Other Aerial Operations

Instructions were given to an assistant mechanic trainee on the repair and servicing of airframes, engines, and spray equipment; also, in mixing chemicals and loading aircraft spray tanks. The pilot-mechanic also advised and assisted in setting up temporary airstrips for spraying operations including organizing equipment for loading aircraft spray tanks, mixing chemicals and instructing flagmen and loaders.

Additional accomplishments for the year were as follows: Maintained records and carried out required maintenance and inspections on the RICP and ex-Libyan-American Joint Service aircraft. Installed VHF and HF radio transceivers in RICP aircraft N-9854F and N-9856F. Maintained the inventory of aircraft spare parts for RICP involving plane parts, engine parts, and other equipment located in Libya; and ordered additional spare parts when needed.

REGIONAL INSECT CONTROL PROJECT - 1961 *

MOROCCO

George E. Cavin

Morocco with a climate similar to California and with approximately the same area has probably one of the greatest agricultural potentials for its size of any country in which RICP has operated. Its agricultural production during the 1959-60 crop year on its 20,000,000 cultivated acres (of which nearly 900,000 are irrigated) was valued at \$494,000,000. The principal crops are wheat and barley with a combined production total of $2\frac{1}{4}$ million metric tons. Production of cereal grains requires 84 percent of the cultivated land area. Other crops of importance are citrus 440,000 tons, grapes 364,000 tons, vegetables such as tomatoes and potatoes 405,000 tons and olives 113,000 tons. Production of cotton and sugar beets has only recently been undertaken, but these two crops along with citrus are expected to be expanded to a considerable degree in the next few years.

Of the nearly 1,000,000 farmers in Morocco, including 6,000 non-Moroccan, only 7,700 are using modern farming practices. Fairly modern pest control measures are being carried out to a large extent on those farms under non-Moroccan control and on the larger Moroccan farms. However, the smaller non-Moroccan farmer has almost completely neglected pest control practices.

The Moroccan five-year plan (1960-64) calls for a sizeable increase in agricultural production. Much of this is expected to be accomplished through expansion of irrigation facilities and through diverting the better dry land areas to higher value crops. However, a major portion of this goal is expected to be reached through educating the farmer to use improved cultural practices and through applications of fertilizers, pesticides, etc.

Morocco's present insect control organization is a division of the Agronomique Research Service. It is headed by Dr. C. Rungs. Its budget for 1959-60 amounted to approximately \$4,230,000. In addition to his duties as Director, Dr. Rungs carries out much of the research work on insect biology, and identification, especially on

* As RICP has not had an Entomologist stationed in Morocco prior to Mr. Cavin's assignment there in October, he gives here a general review of plant protection in Morocco with some preliminary plans for his future program.

lepidopterous insects. Morocco has probably the largest and one of the best kept insect collections of any country in which RICP operates. Card reference files are kept on all the known insect pests of Morocco and cross referenced as to host plants. The Agronomic Research Section has a large library of technical references with a permanent librarian. In addition smaller libraries are to be found in each Division. Summary reports are published periodically of the results of all research investigations. In addition technical bulletins are published on individual research activities.

Under Dr. Rungs' supervision fall two other pest control activities, the Phytosanitary Section and Locust Control. The Phytosanitary Section is headed by Mr. Hudault.

This section is interested primarily in enforcing the plant quarantine rules and regulations of Morocco, insect survey and reporting and carrying out government sponsored control programs. Offices with trained personnel and phytosanitary facilities are located at each major port of entry. Also inspectors are strategically located throughout the agricultural areas of Morocco to observe insect buildups or decline, to survey for new insects and diseases, to determine their distribution and to enforce the internal quarantine regulations. They are also responsible for carrying out certain government sponsored control programs such as cotton insect control and gypsy moth control in the cork forests.

Locust control, although reporting through Mr. Hudault, is essentially a separate section. It is headed by Mr. Gilot with headquarters at Ait Melloul near Agadir in Southern Morocco. It is one of the largest and most effective organizations of its kind in the world. It is composed of a small core of skilled technicians except during invasion periods when it adds large numbers of semi-skilled and unskilled personnel to its rolls.

Locust control in Morocco is also one of the most costly operations of its kind in the world, its financial support coming primarily from U.S. loans which have amounted to over \$11,000,000 since 1954.

Morocco being a secondary locust breeding area is forced to fight primarily a defensive battle to prevent destruction of its high value crops. It, therefore, must concentrate its efforts on swarm control in the desert south of the Anti-Atlas Mountains and in the Souss Valley trap. Since 1955 it has been able to completely prevent any damage to crops north of the High Atlas range and appreciably reduce damage in the Souss Valley.

In addition to the personnel and organizations listed, Morocco has a trained staff of European technicians studying the virus diseases

of citrus. These technicians are financially supported by the Moroccan citrus growers association. FAO also provides an Entomologist who is studying biological control of the California red scale, and it is expected that two German entomologists will arrive shortly to work on the sugar beet production plan.

In the face of all this where does RICP fit in? First of all we have the primary objective of reducing costs on locust control. With firms formulating pesticides in Morocco, adequate transport for hire and 20 commercial aircraft available for pest control work in Morocco a rapid switch over to primarily a contract operation should greatly reduce overhead costs and result in a significant decrease in overall operations costs.

Our second objective is to educate the small farmer in pest control methods and develop a means whereby he can carry out economical control operations. To date general pest control measures in Morocco have been pointed primarily toward export crops. We hope to be able to also assist the farmer providing food for local consumption. To reach this goal we are presently in the process of developing a program of education and demonstrations through the medium of the Agricultural Extension Services by which we hope to eventually reach all the Moroccan farmers.

REGIONAL INSECT CONTROL PROJECT - 1961

SUDAN

Arthur Kaatz

Introduction

The RICP Program in the Sudan is a cooperative undertaking integrated with, and a supplement to, the regular activities of the Plant Protection Division, GOS. Some of the problems of the Division arise from the need of more trained personnel and for more plant protection equipment. There is a serious shortage of vehicles, which has occasionally slowed down the activities of the control units. The Division has expanded rapidly in the last two years and has reached a point where more regional supervisors and regional offices are needed to take some of the work load off the headquarters staff. An improved system of records of work accomplished in the field would also assist plant protection activities.

Advisory Work

During the year the Entomologist acted as advisor and consultant to the Chief, Plant Protection Division on plant protection matters including administration of insect control activities, insecticides, insect surveys, aerial spray programs and organization, experimental insecticide trials and training of staff members. Numerous trips were made with the Chief to observe insect conditions and evaluate insect control activities.

Other important advisory duties with GOS included attendance of FAO Technical Advisory Committee on Locust Control Meeting, Rome and First African Insect Control Seminar, Tunis, with the Sudanese delegation and membership (by GOS request) on Pesticide Regulation Sub-committee for drafting Pesticide Regulations. The regulations have been delivered for further GOS action.

Advice was also given on insect problems to the staffs of Shambat Agricultural Institute and University of Khartoum. A vegetable and fruit insect control guide was prepared, in collaboration with Chief, Plant Protection Division, for use in the Division and Agriculture Extension.

In addition to advisory work with GOS, the Entomologist advised and assisted in insect control problems involving programs of other USOM Agriculture technicians.

Locust Control

During the summer desert locust season of June through September

the locust invasion in the Sudan was sporadic. In the latter part of July a threat built up but after a short time the invasion became relatively light and breeding was limited to the easily accessible areas of the Northern and Khartoum Provinces where the able ground control units of the Plant Protection Division could easily cope with the situation. All locust hoppers were destroyed, thus effectively preventing the start of a new generation which could invade other nearby countries. Most of the swarms were also successfully controlled and the few remaining seemed to disintegrate and disappear. No damage to cultivated crops by desert locust was reported during the season and no aerial spraying of locusts was conducted. RICP assisted actively in the control campaigns through advice and guidance and aerial reconnaissance.

Aerial Operations

For the most of the year the Sudan was without the services of a RICP pilot, largely due to recruitment difficulties. From March through May, however, a pilot was assigned to the Project at Khartoum. During this time he made survey flights in various regions to assist on water hyacinth control. Flights were also made with GOS officials to enable them to observe progress of water hyacinth control on the White Nile River. No aerial spraying for control of this weed was conducted by RICP this year.

Because of threatening locust populations a TDY pilot was requested in July. He arrived August 4 and remained until September 19. During this time he assisted in locust control activities by making regular reconnaissance flights over vast areas of the country to detect presence and intensity of locust populations and to observe progress of ground control units. Because of successful work of these units against the generally light invasions, no aerial spraying of locust was done this year in Sudan.

Establishment of Crop Protection Board

One of the major responsibilities of the Plant Protection Division, GOS, in 1961 was to serve as the action agency for the Central Crop Protection Board. This Board was established in March 1961 by the GOS to take over the duties and responsibilities of insect control in the Government cotton schemes and of those private cotton scheme applying to the Board for crop protection. The Division is directly responsible for the insect surveys in the Gezira, and for both insect survey and aerial spraying operations for the private schemes. The Board has contracted for the services of private aerial spray contractors for all of its spraying activities. To put this new idea into operation an efficient system and plan of operation was required. The RICP Entomologist made suggestions and assisted the Division Chief in developing a system of insect survey for assessing insect infestations, setting up a staffing pattern, and formulating a plan of operation and supervision of the aerial spray

contractors engaged by the Board. With the exception of the Gezira, the decision of what chemical to use and when to spray the schemes is made by the Division Chief with assistance from the Entomologist. Supervisors of survey and aerial spraying are stationed throughout the areas and keep in constant contact with central headquarters by radio. This well-organized operation has resulted in a vastly improved insect control program on nearly a million acres through proper insect counts, proper timing and effective supervision of the aerial spraying. It is of interest that control is being obtained with certain insecticides which last season were thought by some to be no longer effective in the control of these insects in these regions. After seeing preliminary successful results early in the season, other private scheme owners made requests to the Board for crop protection, even though they had originally contracted elsewhere.

Insecticides and Equipment for Small Farmers

During the year the Entomologist again endeavored to interest representatives of insecticide supply firms in the Sudan to stock a limited amount of pesticides and spraying equipment to make them more readily available to the small scheme owners. These growers do not need, nor can afford to buy, insecticides in ton lots which is the usual custom in the Sudan. Effort has been made to interest dealers in handling U.S. manufactured items also.

Quarantine

To assist the GOS in overcoming technical problems connected with the proposed multiple-chamber fumigation building to be constructed at Port Sudan, the assistance of the RICP Plant Quarantine Specialist was requested. The problems were reviewed by the Specialist, the Entomologist and members of the Plant Protection Staff.

Following this study the Specialist supplied recommendation and information which have been incorporated into plans for construction of the unit. A tour of warehouses in the Port Sudan area showed that improvement had been made in insect control, principally through sanitation, over the previous year, apparently due to suggestions made at that time. While in Khartoum, the Quarantine Specialist conducted short plant quarantine training courses, lecturing principally on fumigation to Plant Protection personnel.

Training

One participant was sent to the United States to attend the USDA Plant Quarantine Training Course in New York City. The participant has now returned to the Sudan and is actively engaged in making use of his newly-acquired techniques and methods. Originally two participants had been selected to go, but one of them became ill enroute to New York and had to be returned.

As a part of the overall objectives of the USOM/Sudan Agricultural

Development Program, RICP in cooperation with the Agriculture Engineering Project sent six pilot trainees to the NATP in Addis Ababa. These trainees will provide a nucleus of aerial spray pilots for GOS water hyacinth and locust control programs.

Equipment for GOS

Funds in the amount of \$20,000 were allotted by USOM/Sudan to assist GOS in the development of plant protection activities by providing a number of insecticide applicators and vehicles for use in insect survey and control activities. All bids have been let for the purchase of this equipment but the equipment has not yet arrived from the United States.

REGIONAL INSECT CONTROL PROJECT - 1961

TURKEY

Flournoy M. Philips

Administration and Budget

There had been no RICP Entomologist in Turkey since October 1960 until the arrival of the present Entomologist in September 1961. There was no definite RICP program in Turkey during that period. USOM/Turkey has maintained a budget for Plant Protection and has serviced the Plant Protection General Directorate on a limited scale, primarily with funds. These funds were used for supporting two participant trainees in the USA and for some commodities which were imported for use by the Diyarbakir Institute. However, these commodities were still in customs in November apparently will be for some time.

A total of \$15,000 was spent by USOM/Turkey for the Plant Protection Project in FY 1961. Two participants were sent to the United States for participant training in entomological work at \$5,000 each and \$5,000 was spent for purchase of technical equipment. The USOM/Turkey FY 1962 Plant Protection budget calls for \$20,000. These funds will be used for participant training and commodity support. The FY 1961 Turkish Plant Protection budget amounted to \$4,549,884. The FY 1962 budget is set up for a 50 percent increase, but had not been approved by November 1961.

Major Plant Pest Problems

The Plant Protection officials of the Ministry of Agriculture of Turkey consider the sann pest to be of primary importance to the agricultural economy of Turkey. They are devoting a great portion of their budget to the investigation of control measures to be applied, to the actual application of insecticides and to the rearing and releasing of natural parasites. Tobacco blue mold (Peronospora tabacina) has progressed across Europe in the past three years and has invaded Turkey in the Thrace region and in a marginal area of Asiatic Turkey. As of 1961 there was not an extreme amount of damage being done to the tobacco crop, but if the disease continues to progress at the rate it has in the past, it will cause extensive damage within the next two years. Tobacco is one of the primary sources of foreign exchange for Turkey so there must be some definite action taken immediately.

The pink bollworm, spiny bollworm and spider mites are of serious concern to the cotton industry of Turkey. The Turkish Government is instituting a program of requiring all cotton gins to sterilize

cotton seed as a continuous process of ginning to help control the bollworms. There is a great need for extension activities in this field to educate the farmer to the need and advisability of using proper control procedures on these pests.

The olive fruit fly (Dacus oleae) and the olive moth (Prays oleellus) are of extreme importance to the olive industry and while attempts are being made to control these pests, the real problem is again education of the farmer as to the great value of a good control program. In addition there must be a large amount of work done on the marketing setup in Turkey to give the farmer the proper desire for good insect control programs. As it is now, the price obtained for olives which have dropped from the tree, infested with larvae of Dacus oleae, bring the same price on the market as those which are uninfested.

Plant Protection officials consider that rodents are of major importance to agricultural production, particularly in the Anatolian Plains where a great deal of the cereal crops are grown. An annual crop loss of approximately 10 percent is reported with losses as high as 30 percent in some years.

Survey

A National Museum was started in Turkey this year. At present it is housed in temporary quarters, but the 1962 Turkish budget has funds included for construction of permanent quarters. The national survey program which was started last year has begun to bear fruit. It is by no means a model operation, but progress is being made and with more assistance, primarily technical, greater progress should be made in the coming year. An invitation has been extended for the RICP Survey Specialist to come to Turkey to help with establishing a functional survey system.

Insect Toxicology Laboratory

The Plant Protection officials have submitted a proposed project for an insect toxicology laboratory to the State Planning Board. This proposal has been approved by the Board but it is not known whether funds are to be allocated for the purchase of new equipment and construction of quarters for this project.

Training

At the end of 1961 there was one participant in the United States on a one-year entomological course of study and one had just returned. The returning participant is to be assigned back to the Ankara Research Institute.



survey



quarantine



REGIONAL INSECT SURVEY PROGRAM - 1961

J. W. Gentry

Introduction

The position of Survey Specialist and Assistant Coordinator was filled March 13, 1961 when the Entomologist from Tunisia made a direct transfer to Beirut. The need for a Survey Specialist in the Regional Insect Control Project has been apparent for several years. In some of the countries in which the project operates knowledge of economic insects is grossly inadequate for plant quarantine and general control purposes. Therefore, primary effort has been directed toward detection and appraisal surveys this year, especially in Afghanistan and Ethiopia. Attention is also needed in, and is being given to, other major phases of survey such as: (1) training in basic techniques and procedures, (2) establishment and maintenance of reference collections of authoritatively determined material, (3) organization of effective survey operations as an integral part of plant protection, (4) preparation and use of insect activity data for control purposes and (5) maintenance of permanent insect pest records.

Special Surveys in Afghanistan and Ethiopia

Intensive surveys of 3 to 4 weeks duration each were made in Afghanistan and Ethiopia at optimum times for insect activity. Major crop regions were visited and the work was concentrated on insect pests of the more important crops. Training and demonstration sessions were given in survey procedures including the evaluation of economic insect infestations; collection, identification, preparation and preservation of specimens; and the preparation of survey pest reports and records. Over 300 lots of specimens were submitted to Washington for determination and addition to the United States National Museum collection. According to available literature the surveys revealed several new records for the two countries. Reports and recommendations were made following each tour. It should be pointed out that the special work in Afghanistan was part of an expanded survey program being conducted under the leadership of the RICP Entomologist of that country.

Organization and Planning in Iran and Turkey

In some countries such as Turkey and Iran where plant protection is more advanced, improvement is needed on survey in organization and operational procedures. A week was spent with the Iran survey entomologist and the RICP country Entomologist advising on these phases. Similar services will be offered Turkey during the coming year.

Compilation on Destructive Insects

A compilation on destructive insects of the RICP area has been undertaken. This is being compiled from world literature, RICP reports, personal observations and U.S. Department of Agriculture and U.S. National Museum determination reports. It will show nomenclature information, hosts, distribution and economic importance. Such a reference source will be of basic importance in plant protection work in the area, especially in the plant quarantine field. The information will be of value also to various agencies of the USDA involved with foreign insect pests as well as AID entomological agencies outside the immediate RICP area. A preliminary list of cotton insect pests has been released to project entomologists and other preliminary lists will soon follow. Ultimately, all lists will be brought together under one cover in final form for general distribution. In connection with this work, many valuable reprints and reports have been obtained from various agencies, especially Overseas Agronomic Institute, Florence, Italy and Food and Agriculture Organization of United Nations, Rome.

Education and Training

During the year lectures and training sessions were given to about 550 plant protection and related personnel including faculty and students of 3 National agricultural colleges and 1 high school, in Tunisia, Turkey, Iran, Afghanistan and Ethiopia. About 50 plant protection personnel received actual field training in survey techniques. Special attention has been devoted to color and black and white photography of outstanding crop pests. **This material** will be of value as a training aid in the Region as well as in U.S. plant protection agencies.

Collection and Identification of Specimens

The greatest deterrent to general survey work in the Region is the lack of adequate identification facilities. With the exception of a few of the countries, all identifications must be obtained from outside sources. The USDA and USNM taxonomic staffs, although seriously understaffed, attempt to handle RICP identifications. In an effort to alleviate the situation, arrangements have been made with British Commonwealth Institute of Entomology, London, and Pasteur Institute, Paris, to handle a limited number of specimens from the Region. Additional effort will be devoted to this important phase of the work during the coming year.

Field work resulted in collection or assistance in collection and submission of 408 lots of insect specimens during 1961. This does not include collections made independently by the various entomologists.

Several large lots of outstanding insects not known to occur in the United States were submitted to the United States Department

of Agriculture for reference purposes in insect detection. Included in these are the pine processionary moth, a peach aphid (Pterochlorus persioae), citrus psyllid, senn pest of grain, Eurydema cabbage bugs, lucerne-flea, black parlatoria scale of citrus, melon fly, fig wax scale, Monosteira lace bugs of shade and fruit trees and almond sawfly.

Administrative

In addition to survey activities time was devoted to administrative duties in the Beirut office as needed, including those of Acting Coordinator during the periods the Coordinator was in the field.

REGIONAL PLANT QUARANTINE PROGRAM - 1961

F. P. Hubert

Introduction

During 1961 assistance in plant quarantine activities was extended to 14 countries: Afghanistan, Ethiopia, Ghana, Iran, Jordan, Lebanon, Liberia, Libya, Morocco, Pakistan, Sudan, Tunisia, Turkey, and United Arab Republic. Priority was given and emphasis concentrated in Turkey, Iran and Pakistan of CENTO. As needed the writer also acted as Coordinator in addition to regular duties. Throughout the year both liaison and cooperation were continued with the UN-FAO, the CENTO Secretariat and the Plant Quarantine Division of the USDA. In September 1961 the Specialist completed his second assignment after nearly five years of plant quarantine activities in the Middle East and Africa and returned to the U.S.A. This report, therefore, is for the period of January through September 1961.

Activities

Main lines of activity during 1961 continued to be the inter-connected plant quarantine fields of basic legislation, quarantine and orders; organization and planning of plant quarantine sections; methods of treatment for plant pests in imports and exports of plant quarantine interest; appraisal for pest risk in carriers and in both imports and exports at specific ports of entry; plans for construction of inspections and treatment facilities; acquisition and use of audio-visual material both for training and publicity; assistance in insect pest and plant disease surveys of quarantine interest; plant quarantine training and dissemination of a wide range of informative literature and technical data.

Second CENTO Plant Quarantine Customs Meeting.

The second CENTO Plant Quarantine Customs Meeting was held at Istanbul, Turkey, May 8-12, 1961. At the request of the U.S. Economic Coordinator for CENTO affairs this Specialist made all preliminary arrangements for the Meeting including the draft agenda and local facilities. The meetings were highly successful due to the active participation and sustained interest of the CENTO Plant Quarantine and Customs delegates in all phases of plant quarantine activities. Individual CENTO regional country reports were much more comprehensive and better organized than at the previous meeting. The assignment by the CENTO Secretariat of an officer to handle drafting of the final report and publicity as well as to interpret policy and procedure was of great assistance. The Specialist was again co-chairman with the Chief Plant Protection Delegate from Turkey, the host country. Major CENTO area country accomplishments since the previous meeting included (1) the revision of the 46-year-old Plant Quarantine Rules and Regulations as well as an increase of personnel in Pakistan; (2) the

construction of plant quarantine inspection and treatment facilities in the Caspian Sea area and a detailed compilation of insect pests of Iran; and (3) assignment of personnel to international airports in addition to increased insect surveys, publicity and quarantine training by Turkey.

Plant Quarantine Publications and Lectures

"A Review of Treatment of Citrus Fruits for Control of Mediterranean Fruit Fly" was published in FAO Plant Protection Bulletin in April 1961. This article, printed in English, French and Spanish, has also been translated in Arabic and Turkish.

A second article "Fumigation of Sorghum (Milo) with Hydrogen Phosphide Gas under Plastic Tarpaulins at Djibouti, French Somaliland" has been sent to Washington, D.C. for review, necessary changes and approval. Preliminary arrangements have been made for possible publication in Agricultural Chemicals. A paper on the "Principles, Aims and Purposes of Plant Quarantine" was delivered at African Insect Control Seminar, January 25 - February 3, 1961 Tunis, Tunisia.

Republic of Sudan Evaluation of Fumigation Requirements

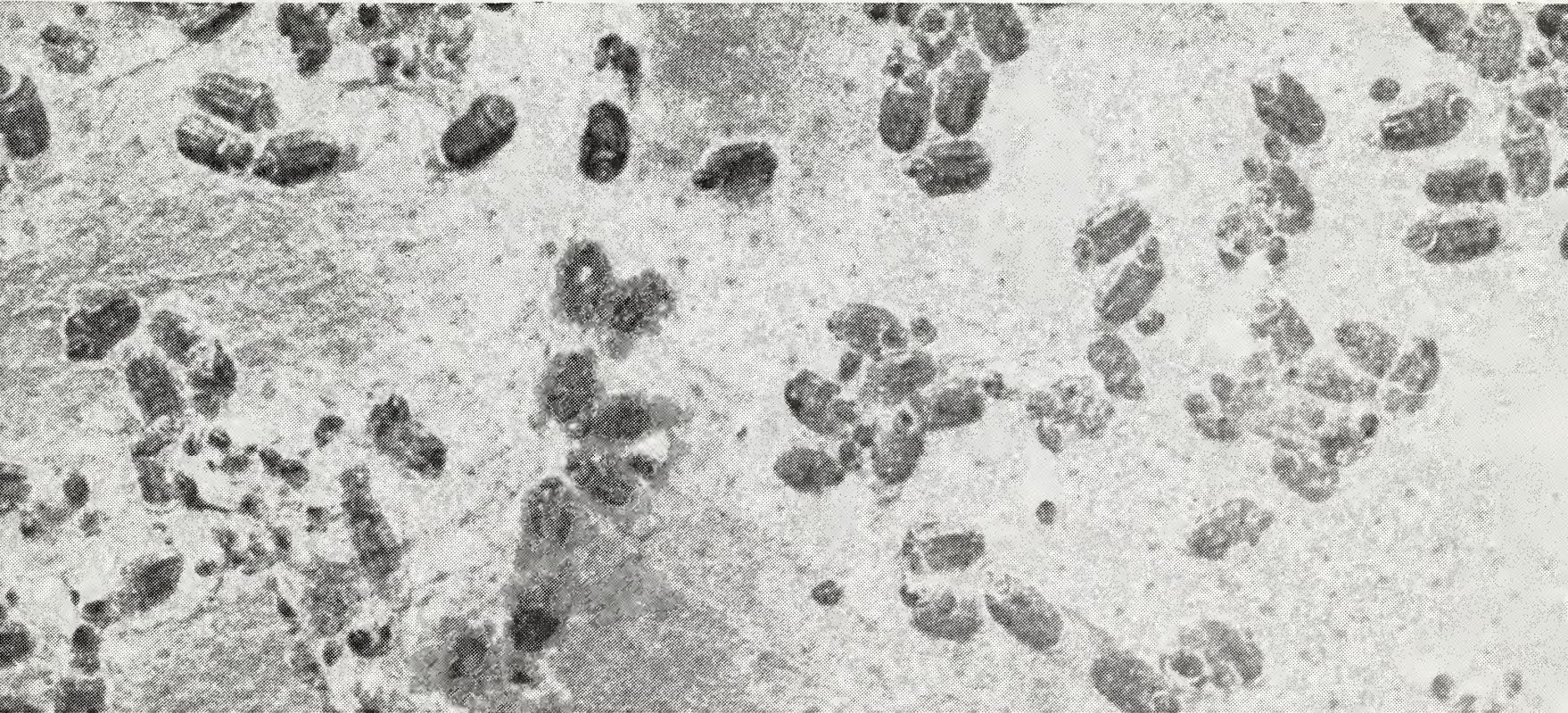
The period of March 4 through 18 was spent at Khartoum and Port Sudan in the Sudan in the evaluation of the requirements for fumigation of agricultural exports and imports as well as treatment of port warehouses. Detailed examination showed that increased tonnage of agriculture exports fully justified the erection of multiple atmosphere fumigation chambers in view of complaints by importing countries of infested exports. A number of modifications in plans for the Port Sudan Treatment Plant were made at Khartoum, and sources of supply of special equipment as well as solution of engineering problems were later secured from Washington, D. C. After a study of the proposed site for the Port Sudan treatment plant the favorable and also unfavorable aspects were indicated in the report along with precautionary recommendations. Examinations of warehouses at Port Sudan showed that considerable progress has been made in eliminating infested conditions. Recommendations were made as to the most satisfactory insecticide to use at this location.

Republic of Turkey Plant Quarantine Improvement

At the request of the Under Secretary of State of the Ministry of Agriculture a special study was made of the Turkish Plant Quarantine Service. During visits to Turkey in conjunction with other matters consultations were made at different levels with Service personnel on aspects of the organization and operation of the Turkish Plant Quarantine Service. Actual operations were also observed at several stations. Recommendations for overall improvements included (1) development of an organization planning and staffing pattern, (2) increase of qualified personnel, (3) necessity for training of senior officers in advanced Western countries and development of a Turkish training program for junior officers, (4) need of increased pest surveys, (5) development and use of operations manual, and (6) treatment facilities.



*insect
conditions*



SUMMARY OF INSECT CONDITIONS - 1961

AFGHANISTAN

By E. R. Millet

This summary is based on an almost countrywide survey made in Afghanistan during the spring, summer, and autumn of 1961. Of 302 collections submitted to the U.S. Dept. of Agriculture for determination, 232 returns have been received to December 1. Almost all of the species mentioned in this summary are based on these returns. The writer is indebted to, and wishes to thank the specialists whose cooperation made these determinations possible. A list of the determinations is available from the Beirut RICP office.

Cereal and Forage Insects

A WEEVIL LARVA (Hypera sp., close to H. postica, and H. brunneipennis) caused moderate damage to alfalfa at Mazar-i-Sharif and Kabul. SENN PEST (Eurygaster integriceps) and a PENTATOMID (Aelia melanota) were light in the Qaisar and Maimana areas (less than 5 per sq. meter) and damage did not merit control. Specimens of Eurygaster sent to Germany by Afghan Plant Protection officials were identified as E. integriceps with a complex of 3 sub-species straminea, testacea, and plagiata. Other insects collected from wheat included a MIRID (Lygus gemellatus) PENTATOMIDS (Dolycoris penicillatus, Holcogaster peltatus, Tholagmus nigricornis, Dolycoris baccarum, Eurydema maracandium, E. fulchrum, E. ornata and Carpocoris purpureipennis) and a PYRRHOCHORID (Pyrrhocoris apterus). It should be noted that wheat fields contained many wild plants, especially crucifers. A THrips (Haplothrips tritici) was numerous in the heads of wheat in the Helmand Valley and Kabul area during the summer. WEEVIL damage to alfalfa was light throughout Afghanistan this year. STALK BORERS (near or Chilo zonellus) were very heavy in corn at Jalalabad. Two BORERS, one probably Argyria sticticraspis in the stem, and the other, probably Emmalocera depressoella in the roots, infested 25 percent of sugarcane at Jalalabad. A medium infestation of APHIDS (Macrosiphum granarium, Sipha agropyrella, and Cavahyalopterus noxius) were found in wheat fields at Paghman. ARMYWORM (Pseudaletia unipuncta) was numerous but not damaging in ripened wheat near Kabul; also observed on young corn. BEET ARMYWORM (Spodoptera exigua) caused damage to alfalfa at Lashkar Gah. SPOTTED ALFALFA APHID (Theroaphis maculata) was prevalent on alfalfa at several locations. Other APHIDS (Theroaphis riehmi and Aphis craccivora) were collected from sweetclover and alfalfa in the Helmand Valley. MIRIDS collected from alfalfa were Deraeocoris punctulatus at Kabul and Jalalabad, Adelphocoris

lineolatus at Kabul, Stenodema laevigatum at Bamian, and Lygus gemellatus at Kabul. These were taken in sweepings. A mixture of LEAFHOPPERS (Macrosteles sp. and Erythroneura sp.) were heavy and doing medium damage to young corn in the Logar Valley.

Locusts

As far as known there was no DESERT LOCUST (Schistocerca gregaria) in Afghanistan during 1961. ITALIAN LOCUST (Calliptamus italicus) and MORROCAN LOCUST (Dociostaurus maroccanus) were not heavy in the northern provinces and the control campaign by the Russians lasted only two weeks. A LOCAL GRASSHOPPER (Oedaleus sp., senegalensis or near) was noted in wheat at Farah in May and was found completely stripping leaves from wheat near Kandahar. Calliptamus barbarus, and Dociostaurus sp. were noted in the desert area near Jalalabad in June and control against these species in crops was applied at Mimlah. Acrida sp. apparently a subspecies of pellucida or near, was apparently doing heavy damage to small pepper plants in the Helmand Valley. Sphingonotus carinatus was collected in a desert area near Mokur. Chrotogonus trachypterus was numerous and caused considerable damage to vegetables in Lashkar Gah. EGYPTIAN TREE GRASSHOPPER (Anacridium aegyptium) was observed at Lashkar Gah and Jalalabad. Pyrgomorpha sp., probably conica, nymphs were found attacking potatoes in the Logar Valley.

Fruit Insects

A PIERID (Aporia crataegi) was light on apricots in Mazar-i-Sharif Province in April and apples at Sar-i-Pul. APHIDS are probably the most widespread and common pest found on fruit trees in Afghanistan. A large, dark purple APHID (Pterochlorus persicae) was extremely heavy and damaging on peach limbs at Coriz-i-Mir, sometimes covering the entire limb for several inches. MEALY PLUM APHID (Hyalopterus pruni) was heavy on apricots and almonds in Mazar-i-Sharif and Shebarghan Provinces and other areas. Other aphids identified from fruit included Anuraphis helichrysi from almond, and Aphis pomi and Anuraphis mali from apple. A. mali caused curling of pear leaves. PEAR PSYLLA (Psylla pyricola) and an APHID (Anuraphis sp.) were found on pears at Sar-i-Pul. Psylla sp. was damaging to pears in Kabul during the summer. ERMINE MOTH (Hyponomeuta padella) was heavy on apples, apricots, and almonds around Maimana. This pest is also widespread in the Kandahar, Gazni, Paghman, and Kabul areas and causes considerable damage to fruits every year. CODLING MOTH (Carpocapsa pomonella) occurs wherever apples are grown in Afghanistan, and with practically no control programs, causes an estimated 35-50 percent damage annually. A GALL-FORMING Hymenoptera, yet undetermined, was found causing exceedingly heavy damage to peach through abnormal growth and rosetting of buds at Coriz-i-Mir. A BUPRESTID (Capnodis carbonarius) was collected on almond between Gazni and

Kalat. WHITE GRUBS caused considerable damage to young apple and pear seedlings near Kabul in September. A light infestation of a MITE (Bryobia rubrioculus) were observed on apple leaves in Kabul in June. A VESPID (Vespula germanica) and ORIENTAL HORNET (Vespa orientalis) were numerous in Afghanistan and caused damage to grapes and cherries at Kabul and Lashkar Gah. The writer was stung on the leg by V. orientalis and the sting was painful for several days and left a sore for two weeks. A SCALE INSECT (Lecanium turanicum tentative) was moderate on apple branches at Sar-i-Pul and very heavy on plum at Maimana. Another SCALE (L. unifasciatum tentative) was heavy on peach limbs in Kabul. PARLATORIA DATE SCALE (Parlatoria blanchardi) was light on date palm in Laghman.

Vegetable and Truck Crop Insects

Cabbage, lettuce, and onions were apparently free of insects in the Jalalabad area in March. Gardens were heavily infested with APHIDS in the Helmand Valley, especially Aphis fabae on beets and Brevicoryne brassicae on cabbage and mustard. CUTWORMS (Agrotis sp.) and WIREWORMS were reported on sugar beets in Kataghan Province. An ARCTIID was found doing heavy damage to cucurbits at Mazar-i-Sharif. RED MELON BEETLE (Raphidopalpus foveicollis) caused heavy damage to melons near Herat in May and was observed in the Helmand Valley in July. MELON FLY (Dacus cucurbitae) caused almost 100 percent damage to melons and cucumbers at Sarobi and Jalalabad in July. The BALUCHISTAN MELON FLY (Myiopardalis pardalina) was extremely damaging to all melons in the Helmand Valley, attacking as high as 65 percent of the fruit in some fields, and with as many as 50 to 100 maggots per melon. A small black melon WEEVIL (Baris probably granulipennis) was also found attacking 5 to 10 percent of melons, particularly watermelons with as many as 50 or more larvae in one fruit. Many melons were found with both weevil larvae and maggots in the same fruit. The TWELVE-SPOTTED MELON BEETLE (Epilachna chrysomelina) caused only nominal damage to melons and cucurbits in the Helmand Valley and at Maimana. A SPIDER MITE (Tetranychus sp.) caused some damage to melons, but only about 5 per leaf were found. A PENTATOMID (Eurydema ornata) was heavy on crucifers in the Kabul and Logar Valley areas. Myzus persicae and Aphis sp. were medium on tobacco at Jalalabad. Aphis gossypii was also medium on okra at Jalalabad. THRIPS (Haplothrips tritici) were collected on oats and crucifers at Bamian. Tetranychus sp. probably kanzawai, was taken from melons at Laghman. Heavy populations of LEAFHOPPERS (Emoasca decipiens and E. decedens) were indicated by sweeps in sugar beets at Kandahar. Macrostelus sp. and Emoasca sp. were prevalent in potatoes in the Logar Valley. A CABBAGEWORM (Pieris brassicae) was collected on wild crucifers at the Shebar Pass, and adults were often numerous elsewhere. A TOMATO FRUITWORM (Heliothis sp.) attacked tomatoes

near Jalalabad. A PENTATOMID (Eurydema ornata) was numerous on radishes in the Logar Valley. A LYGUS BUG (Lygus gemellatus) was also collected on radishes in this area. A COREID (Liorhyssus hyalinus) was found in the seed heads of tobacco at Jalalabad. A CRICKET (Gryllus desertus) was numerous in a garden south of Maimana. Two species of MOLE CRICKETS (Gryllotalpa gryllotalpa and G. africana) were collected under lights and in a garden in Kabul. One of the most interesting collection in Afghanistan this year was an ORTHOPTERA of the Family Schizodactylidae, Schizodactylus monstrosus. This peculiar family is not clearly either in the grylloid or gryllaeridoid group. The insect makes burrows and is sometimes harmful either to plant roots or irrigation canals or dams.

Citrus Insects

CITRUS WHITEFLY (Dialeurodes citri) and YELLOW SCALE (Aonidiella citrina) were found heavy in some citrus groves at Jalalabad and Loghman in March. BLACK SCALE (Saissetia oleae) reported by Plant Protection officials in last year's summary, was not found in the Jalalabad area. CITRUS PSYLLID (Diaphorina citri) was extremely heavy at Laghman and Jalalabad in March, June and September, as many as 200 adults per leaf. CUTWORMS damaged newly-planted citrus seedlings at Abdul Khail. A LEAF MINER (probably Phyllocnistis citrella) was found in orange seedlings at Jalalabad in July and were again numerous in mid-September. A MITE (Eutetranychus orientalis) was collected from citrus at Jalalabad in July.

Cotton Insects

CUTWORMS (Agrotis sp.) and MITES were reported the main problems in cotton in Mazar-i-Sharif Province. SPINY BOLLWORM (Earias insulana) was very light on cotton in the Helmand Valley, but infestations reached 100 percent in patches around Jalalabad. SPIDER MITES (Tetranychus sp.) were observed on cotton in Helmand Valley but only about 1 or 2 per leaf. A WHITEFLY (probably Bemisia sp.) was very heavy in this area in September, with as many as several hundred per leaf. PINK BOLLWORM (Pectinophora gossypiella) occurred in the Jalalabad area this year, but the infestation was not heavy. LEAFHOPPERS (Empoasca decipiens and Empoasca decedens) were heavy in cotton at Kandahar.

Forest and Shade Tree Insects

APHIDS (Eulachnus sp.) were numerous on pines in the Helmand Valley in March and in Kabul in June. A CHRYSOMELID (Plagiodesma versicolora) was heavy both larvae and adults, on willow leaves at Sar-i-Pul and Maimana. A SCALE INSECT (Adiscodiaspis tamaricicola) was exceedingly heavy, almost covering the trunk on tamarisk trees at a government nursery at Darweshan. APHIDS (Chromaphis juglandicola and Callipterus juglandis) were collected on walnut at Paghman. A

LACEBUG (Monosteira discoidalis) caused considerable damage to willow and poplar leaves in the Kabul area. TERMITES (Microcerotermes sp., probably gabrielis) caused heavy damage to roots of young redbud in the government nursery at Kabul. APHIDS (Therioaphis sp.) were exceedingly heavy on all elm trees in Kabul, producing large amounts of honeydew. BORERS (Aeolesthes sarta and Capnodis cariosa) have killed about 25 percent of the elm trees along streets in Kabul, willows and poplars are also heavily attacked in windbreaks and commercial stands. A SCALE INSECT (Eriococcus salicis tentative) was moderate on willow limbs in Kabul. A SCALE (Leucaspis sp.) was heavy and serious on white pine at Paghman. AN APHID (Aphis craccivora) was quite heavy on locust trees throughout Kabul. A GIANT MEALYBUG (Drosicha media tentative) and a small BUPRESTID (Melanophila picta) were collected from willow. Some other insects identified from poplar included an APHID (Chaitophorus populi) in Kabul, A HORNWORM (near or Cerura vinula intermedia) at Paghman, A WHITE SCALE (Aspidiotus (Quadraspisdiotus) armeniacus) on trunk of silver poplar at Paghman.

Ornamental Insects

THrips (Taeniothrips sp. probably undescribed) were numerous in roses at Mazar-i-Sharif, and nymphs of LEAFHOPPERS (probably Edwardsiana rosae) were heavy on roses at Sar-i-Pul. A WHITEFLY (Bulgariaeurodes cotesii) was heavy and damaging on roses in Kabul. APHIDS collected on ornamentals included Aphis gossypii, medium on mint and heavy on zinnia; Anuraphis sp. heavy on cosmos at Lashkar Gah; Macrosiphoniella sanborni heavy on chrysanthemums at Kandahar; and Macrosiphum rosae on roses in Kabul. SOFT BROWN SCALE (Coccus hesperidum) was collected from ivy plants in a greenhouse in Nadi-Ali in March. A SPRINGTAIL (Onychiurus fimetarius) was collected from the soil surface of potted geranium plants in Kabul and Deuterosminthurus repandus was found numerous on a lawn of clover and bermuda grass at Paghman. CICADELLIDS (Erythroneura sp. and Empoasca sp.) damaged castorbeans at Kandahar. A CYNIPID (Diplolepis sp.) was found forming galls on roses at Shebar Pass. A NOCTUID (Heliothis sp.) destroyed buds of carnations at Paghman. Light infestations of HEMISPHERICAL SCALE (Saissetia hemisphaerica) were observed on potted boxwood plants at Paghman. A TINGID (Cystochila delineatus) was moderate on ornamental Papillionaceae at Jalalabad. BEAN BUTTERFLY (Lampides boeticus) severely attacked seedpods of Scotch broom at Kabul.

Stored Grain Pests

Several stored-grain warehouses in Kabul and the surrounding communities were inspected during the summer. Specimens of the following were collected and identified: KHAPRA BEETLE (Trogoderma granarium), Another DERESTID (Attagenus piceus), A PYRALID (Aglossa pinguinalis), TENEBRIONIDS (Pedinus sp. Alphitobius

laevigatus and Tribolium castaneum), and an unusual COCKROACH, probably (Polyphaga sp.), which is usually not a pest but was numerous at time of examination.

Beneficial Insects

The following COCCINELLIDS were collected from sweepings in alfalfa at Kabul: Adonia variegata, Coccinella 7-punctata, C. 11-punctata, Synharmonia conglobata buphthalmus. A BRACONID (Parahormius jason) was numerous in citrus groves at Jalalabad in March, as was also an ENCYRTID (Zeteticontus sp.) A COCCINELLID (Halyzia tschitscherini) was collected from walnut infested with aphids. NABIDS (Nabis ferus and N. capsiformis) were collected from alfalfa sweeping at Kabul and in the Logar Valley. A LACEWING (Chrysopa cornea) was numerous in Persian clover. A TORYMID (Torymus sp.) was found parasitizing a cynipid gall-insect on roses at Shebar. A BRACONID (Apanteles glomeratus) was found apparently associated with Aporia crataegi on apple at Sar-i-Pul.

Miscellaneous Insects

An APHID (Acyrthosiphon sp., prob. mordvilkoi) was very heavy on flax, 100 per sweep, in Logar Valley. MEALY PLUM APHID (Hyalopterus pruni) was heavy on reeds in same area. APHIDS were collected and identified on many wild and miscellaneous plants as follows: Anuraphis, probably tulipae, on wild iris; Anuraphis cardui on thistle; Aphis gossypii and Myzus persicae on hollyhock; Aphis fabae on nightshade; and Aphis rumicis on dock. LEAF-CURLING ANTS, (Polyrhachis sp.) were observed on pear leaves at Jalalabad. TWO PENTATOMIDS, (Schizops aegyptiaca and Odontotarsus freyi) were collected in grass at Lashkar Gah. EARWIGS (Labidura riparia) were common at both Lashkar Gah and Kabul. A NYMPHALID, near or Vanessa cardui, was light on thistle and hollyhock near Paghman.

Man, Animal and Household Insects

Five species of HORSE FLIES were collected at Paghman: Atylotus near agrestis, Tabanus cordiger, T. leleani, T. bromius, and Tabanus sp. near miki. PSYCHODIDS (Psychoda alternata) were collected on the toilet walls in Mazar-i-Sharif. A SIMULIID (Simulium (Wilhelmia) sp. perhaps aretjanae) was collected at Kabul. A LOUSE FLY (Hippobosca longipennis) was very heavy and annoying to dogs at Lashkar Gah and Kabul.

Infestation by a TERMITE (Microcerotermes sp.) was very heavy in roof timbers of mud houses in the Helmand Valley. MOSQUITOES (Aedes caspius and Culex pipiens quinquefasciatus) were quite annoying in Jalalabad. COCKROACHES (Shelfordella sp.) were numerous in houses in Kabul, but the species apparently does not breed inside houses. BEDBUG (Cimex lectularis), which is quite common, brought complaints from several American homes in Kabul. HOUSE FLY (Musca domestica) was heavy in bazaars and villages.

SUMMARY OF INSECT CONDITIONS - 1961

ETHIOPIA

By W. C. Kurtz**

Cereal and Forage Insects

DESERT LOCUST (Schistocerca gregaria) infestation in June was considered by the British Desert Locust Survey as the heaviest since 1954. This was centered in the Railway Area between Awash and Dire Dawa with escapes moving eastward toward the Somali Republic. The summer season in northern Ethiopia was light and Ministry ground control was reported as effective. NUTGRASS ARMYWORM (Spodoptera exempta)* was again heavy this year in central and western Ethiopia, causing widespread damage to small grains, principally teff (Eragrostis abyssinica). MAIZE STALK BORER (Busseola fusca)*(?) is widely distributed and was of major importance on sorghum and corn, being found in older stalks of sorghum near the head; also in stalks and ears of corn. Stalk and ear infestations of 10-50 percent were common. In young sorghum a borer, possibly same species, was found throughout the stalk. CORN LEAF APHID (Rhopalosiphum maidis) was common but not damaging. At Jimma heavy infestations of LEAFHOPPERS were found in experimental soybeans. MIRIDS (Proboscidocoris punctaticollis)* Polymerus sp.* and Deraeocoris tibialis* were also found in these soybeans. A PENTATOMID (Agonoscelis versicolor)* was reported heavy on sorghum in western Eritrea.

Fruit and Nut Insects

BROWN SOFT SCALE (Coccus hesperidum) and COTTONY CUSHION SCALE (Icerya purchasi) are generally distributed throughout Ethiopia on citrus. Many orchards have been made unproductive by severe infestations of scale insects, particularly those two species. Efforts are being made to introduce vedalia (Rodolia cardinalis) as a control measure against I. purchasi. FLORIDA RED SCALE (Chrysomphalus aonidum) and CALIFORNIA RED SCALE (Aonidiella aurantii) were common on citrus at Debre Zeit and Nazareth. PURPLE SCALE (Lepidosaphes beckii) was damaging to citrus at Jimma. BLACK PARLATORIA SCALE (Parlatoria zizyphus)* was the outstanding pest and required controls in some citrus orchards in Eritrea. A light infestation of this scale was also found at Wuchale, near Dessie, on citrus. Light infestations of the MEDITERRANEAN FRUIT FLY (Ceratitis capitata) and a MOTH (Argyroplcce sp.) were found in citrus fruits at Wuchale

* Identified by USDA or USNM specialist.

** Includes observations by J.W. Gentry

and in Eritrea. At Ghindi, near Asmara, there was a heavy infestation of MITES (Eutetranychus orientalis)* on citrus, the first such infestation, according to the local entomologist, ever recorded in that area. A PSYLLID (Spanioza (Trioza) erytreae)* caused considerable damage to new leaves of citrus in Debre Zeit and other areas. An ORANGE-DOG (Papilio demoleus v. demodocus), and probably other species, destroyed foliage on young orange trees in many areas. Damage to citrus terminals by an undetermined LEAF MINER was noted in Eritrea. Custardapple (Anona sp.) fruits were heavily infested with STRIPED MEALYBUG (Ferrisia virgata)* at Dire Dawa. Adults of a CALLIPHORID FLY (Chrysomya putoria)* were reported as causing heavy damage to ripe grapes at Nazareth. Although it is doubtful that the flies were causing primary damage, populations were extremely heavy and were a nuisance in the vineyard as well as in citrus orchards where they were attracted to honeydew of scale insects. Light infestations of APHIDS were noted on citrus in Eritrea.

Vegetable Insects

At Debre Zeit a heavy infestation of a SAWFLY (Athalia sp.)* and a CUTWORM (Agrotis sp.)* occurred on cabbage. A NOCTUID (Prodenia litura) was also found on cabbage. A LEAF MINER infested 20 percent of leaves in experimental planting of sweetpotatoes. CABBAGE APHID (Brevicoryne brassicae) was observed at Jimma but was well controlled by a parasite (Diaeretiella rapae)*. Root crops at Jimma had heavy nematode populations. TWELVE-SPOTTED MELON BEETLE (Epilachna chrysomelina) and a CERAMBYCID stem borer were causing injury at Dire Dawa to cucurbits. Also at Dire Dawa MELOIDS (Mylabris sp.) were prevalent on beans. Fava beans suffered some pod damage from NOCTUID larvae and bean butterfly (Lampides boeticus) was observed at several locations. Diamondback moth (Plutella maculipennis) was heavy on crucifers at Debre Zeit and north of Senafe. Near Senafe 20-40 percent losses were sustained to crucifer transplants by Agrotis CUTWORMS on two modern farms. Severe loss was also found on potatoes in storage from POTATO TUBERWORM (Gnorimoschema operculella). Light infestations of PEA APHID (Macrosiphum pisi) on lentils were noted in several areas. At Robi eggplant had a heavy infestation of a COCCINELLID, apparently Epilachna hirta. A red ANT caused considerable damage to roots of many vegetables. A moderate infestation of a NOCTUID, probably Heliothis armigera was found on peppers near Ambo.

Stored-Products Insects

Poor storage facilities, lack of chemical control, presence of most of important grain pests and favorable climate give rise to devastating infestations of stored grain insects in Ethiopia. Estimates of 50-60 percent loss of stored products were obtained. In the Jimma area, it was reported that 2 months after harvest about 85 percent of grain was infested and corn disappeared from the market by this time because of insect damage. Examination of several lots of new-crop grain and legumes on the Addis market in October showed

infestation as follows: wheat 0 percent, sorghum 8, corn 15, chickpeas 10. Wheat, corn, lentils and chickpeas in storage for several months at one Jimma location showed infestation of 15 to 100 percent. Rice weevil (Sitophilus oryzae) was the dominant species in the grains and a bean bruchid (Callosobruchus chinensis)* was the major pest of the legumes.

Cotton Insects

A COTTON STAINER (Dysdercus nigrofasciatus)* and COTTON SEED BUG (Oxycarenus hyalinipennis)* were found near Waldia, where 75 percent of open cotton bolls were infested in some fields. In the Gibee River Valley cotton was heavily infested with a LEAFHOPPER. Previous reports from this area indicated the presence on cotton of a WHITEFLY, SPINY BOLLWORM (Farias insulana), STAINERS, and a LEAF FEEDER, possibly (Heliothis sp.). Light infestations of the COTTON APHID (Aphis gossypii) were also found near Waldia. Evidence of BOLLWORM damage near Waldia and at Gibee was noted but no specimens were recovered. Heavy infestations of THrips were reported from various areas.

Coffee Insects

At Jimma a STINK BUG (Antestia lineaticollis)* was found on coffee. Other coffee insects found were a LEAF MINER, SCALES and MEDITERRANEAN FRUIT FLY. The latter feeds on the placenta of the berries but does not apparently reduce the marketable value of the crop. A heavy infestation of a GREEN SCALE (Coccus sp.) at Harrar caused yield reduction and dieback. In the Jimma coffee area insects reportedly do only 6-7 percent damage.

Oil Seeds Insects

Neug (Guizotia abyssinica), a composite grown for the oil from the seed, was heavily infested with THrips in some areas. Flax was also heavily infested with thrips in many fields. Mustard, grown for oil, had light populations of Eurydema bugs, APHIDS and SAWFLIES. NUTGRASS ARMYWORM (Spodoptera exempta) was found on neug near Ambo but little damage was noted.

Shade Trees and Ornamentals

SCALE INSECTS, particularly Icerya purchasi and Coccus hesperidum were prevalent on ornamentals. OYSTERSHELL SCALE (Lepidosaphes ulmi) and a PSYLLID were serious on Vernonia amygdalina in Addis. Palms were heavily infested with SCALES at Harrar. Hibiscus at Jimma was infested with a LYGAEID (Oxycarenus sp. near lavaterae)*. MEALYBUGS and SCALES were common on ornamentals and street trees in Asmara. Aspidiotus lataniae* was heavy on mulberry at Dire Dawa.

SUMMARY INSECT CONDITIONS - 1961

IRAN

by G.T. Brooks and
G. Farahbakhsh

Cereal and Forage Insects

DESERT LOCUST (Schistocerca gregaria) infestation occurred in the spring in three provinces of southern Iran, Khuzestan, Fars, and Kerman. In the fall, light swarms were received in Baluchistan and Fars. Damage was generally light. MORROCAN LOCUST (Dociostaurus maroccanus) infestations were limited to light outbreaks in Gorgan and heavy infestations in the Moghan Plains. Native GRASSHOPPERS (Calliptamus spp. and Dociostaurus spp.) were generally distributed throughout the country. SENN PEST (Eurygaster integriceps) infestations were heavy in the Tehran, Isfahan, and Lorestan with Aelia spp. being heavy in the Azerbaijan Province.

DURRA STEM BORER (Sesamia cretica) caused heavy damage to sugar-cane in Khuzestan and attacked corn and sorghum in the Caspian Sea area. The ALFALFA WEEVIL (Hypera postica) was the serious pest of alfalfa at Karaj. Heavy infestations of CORN LEAF APHID (Rhopalosiphum maidis) were limited to corn in the Caspian Sea area. A MARGARODID (Porphyrophora tritici) caused severe damage to wheat in Hamadan and Arbodil.

Deciduous Fruit and Olive Insects

BLACK SCALE (Saissetia oleae) reached heavy infestation proportions in the olive area of Rudbar. OLIVE SCALE (Parlatoria oleae) was heavy in the deciduous fruit growing area at Tehran and Karaj. Medium to heavy infestations of Chionaspis asiatica occurred on plum and apricot trees in the Karaj and Tehran areas. Infestations of OYSTERSHELL SCALE (Lepidosaphes ulmi) were heavy in Tehran area. Heavy outbreaks of PEAR LACEBUG (Stephanitis pyri) occurred on apples in the Tehran area. The OLIVE PSYLLID (Euphyllura olivina) caused only light damage to the olives at Rudbar. Severe infestations of ERMINE MOTH (Hyponomeuta padella) occurred on cherry, apple, and almond trees in the Hamadan area. The WOOLY APPLE APHID (Eriosoma lanigerum) attained medium to heavy infestation in the Caspian Sea area and Tehran. Sporadic infestation of GREEN PEACH APHID (Myzus persicae) occurred throughout the deciduous fruit area reaching heavy proportions in some areas. The MEALY PLUM APHID (Hyalopterus pruni) severely infested young almond trees in Semnan. An aphid (Pterochlorus persicae) caused heavy damage to apricot and peach in Hamadan and Semnan. APHIDS (Anuraphis sp.) also caused

severe leaf curling on peach trees in Damavand, Semnan, and Hamadan. Infestations of LEOPARD MOTH (Zeuzera pyrina) were heavy on apples in the Tehran area. Light infestations of the MITE (Bryobia rubrioculus) occurred at Damavand on apples and at Hamadan on cherry.

Citrus Insects

Heavy infestations of the CITRUS RUST MITE (Phyllocoptrus oleivora) occurred throughout the Caspian Sea citrus growing area except at Gorgan. In the citrus area of the south, Khuzistan, Fars, and Kerman medium infestation of the MITE (Eutetranychus orientalis) developed. In the Caspian Sea citrus area heavy outbreaks of the following scales occurred: CALIFORNIA RED SCALE (Aonidiella aurantii) at Ramsar; YELLOW SCALE (Aonidiella citrina) at Babolsar, Babol, Amul and Lahijan; BROWN SOFT SCALE (Coccus hesperidum) at Khoramabad, Pahlavi, and Ramsar; and COTTONY CUSHION SCALE (Icerya purchasi) in scattered areas. The PURPLE SCALE (Lepidosaphes beckii), CHAFF SCALE (Parlatoria pergandii) and BLACK PARLATORIA SCALE (Parlatoria zizyphus) were of major economic importance throughout this area. Heavy infestation of the GRAPE MEALYBUG (Pseudococcus maritimus) was limited to Pahlavi, Ramsar, and Lahijan.

Truck Crop Insects

The CABBAGE APHID (Brevicoryne brassicae) severely attacked cabbage throughout Iran. Infestations of an ONION MAGGOT (Hylemya sp.) on garlic at Hamadan and Ahwaz reach heavy proportions. Infestations of BEET ARMYWORM (Spodoptera exigua) continued light this year. SUGAR BEET CROWN BORER (Gnorimoschema ocellatella) was severe this year throughout Iran.

Forest, Shade Tree and Ornamental Insects

Throughout Iran heavy infestations of the ELM LEAF BEETLE (Galerucella luteola) occurred on elm. A BUPRESTID (Melanophila sp.) was found infesting Populus nigra at Borjerd. A CHRYSOMELID (Melasoma populi) caused serious damage to poplar at Tehran and Karaj. Infestation of BLACK SCALE (Saissetia oleae) was heavy on oleander at Babolsar. EUROPEAN ELM SCALE (Gossyparia spuria) caused heavy damage to elm at Karaj and Tehran. Infestations of A WHITEFLY (Siphoninus granati), as last year, were heavy on ash in Tehran. LACEBUGS (Stephanitis pyri and Monosteira unicostata) were respectively found infesting Chaenomeles japonica at Chalus and Populus hybrida at Nowshahr. Throughout Iran APHIDS (Pemphigus spp.) attacked poplar. Heavy infestations of CHRYSANTHEMUM APHID (Macrosiphoniella sanborni) on chrysanthemum were also found throughout the country. An APHID (Eriosoma lanuginosum) was severe on elm throughout Iran as well as the ROSE APHID (Macrosiphum rosae) on rose. The APHID (Myzus certus),

as last year, caused severe leaf curl to pansy plantings at Tehran. Another APHID (Lachnus salignus) was reported causing limited damage to willow at Rezaiyeh.

Beneficial Insects

Approximately 65,000,000 SENN PEST PARASITES (Microphanurus semistriatus) were reared and released in senn infested fields at Isfahan. For control of the cottony cushion scale in the Caspian area Rodolia cardinalis was reared and distributed. In the Rudbar and Ramsar area it has not been determined whether or not the ENCYRTID PARASITE (Metaphycus helvolus) released for control of Saissetia oleae has become established. A FUNGUS (Cephalosporium lecanii) continued to effectively control Pulvinaria floccifera in the Caspian area.

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SUMMARY OF INSECT CONDITIONS - 1961

LIBYA

By R. L. Linkfield
A. Damiano

Cereal and Forage Insects

This year there have been no reports of DESERT LOCUST (Schistocerca gregaria) in Libya. APHIDS (Toxoptera graminum, Rhopalosiphum padi, R. maidis and Cavahyalopterus sp.) were first observed on small grains in January. Infestations of SPOTTED ALFALFA APHID (Therioaphis maculata) were very light; however another APHID (Aphis sp.) was heavy on alfalfa. EGYPTIAN COTTONWORM (Prodenia litura) was very heavy on alfalfa and other crops. Infestations were reported for the first time in Sorman and Homs. ALFALFA WEEVIL (Hypera postica) caused considerable damage to the first cuttings in Tripolitania.

Fruit and Olive Insects

Due to ideal weather conditions this year, the OLIVE FRUIT FLY (Dacus oleae) caused severe damage to the abundant olive crop. Control measures were conducted wherever possible. BLACK SCALE (Saissetia oleae) was very heavy on olives in Misurata and Zavia. The SCOLYTID (Phloeotribus scarabecides) caused appreciable damage to olives in Tripolitania. OLIVE SCALE (Parlatoria oleae) and OLIVE PSYLLID (Ephyllura olivina) were of minor importance this year. A SCARABAEID

(Tropinota sp.) caused considerable damage to flowers of almonds at Tajura. ALMOND BUG (Monosteira unicostata) attacked pears in some areas, and was very heavy on almonds. The CODLING MOTH (Carpocapsa pomonella) caused very heavy damage to apples, pears and quince. In April and May heavy infestations of the MEDITERRANEAN FRUIT FLY (Ceratitis capitata) were observed on peaches and pears in the Tripoli area, and on apricot fruits along the Tripolitania Coast.

Citrus Insects

Punctures of the MEDITERRANEAN FRUIT FLY (Ceratitis capitata) on early orange varieties were first observed in July. Populations this year were extremely high, and all tangerines not sprayed were totally destroyed. Infestations of the TWO-SPOTTED SPIDER MITE (Tetranychus telarius) were reported in January, and heavy populations caused considerable damage. A MITE (Brevipalpus obovatus) was very heavy on lemon trees, especially in Tajura and El Myra. DICTYOSPERMUM SCALE (Chrysomphalus dictyospermi), BLACK PARLATORIA SCALE (Parlatoria zizyphus) and CHAFF SCALE (Parlatoria pergandii) were present in many groves. The BLACK CITRUS APHID (Toxoptera aurantii) was serious in some citrus groves in Tripolitania.

Vegetable Insects

EGYPTIAN COTTONWORM (Prodenia litura) attacked most vegetable crops (tomatoes, potatoes, etc.), causing considerable damage. A NOCTUID (Heliothis armigera) was common on early tomatoes and beans in the Tripoli area. CABBAGE APHID (Brevicoryne brassicae) caused heavy damage in January. DIAMONDBACK MOTH (Plutella maculipennis) occurred in medium infestations. ONION THrips (Thrips tabaci) was very heavy on onions and garlic. MEDITERRANEAN FRUIT FLY (Ceratitis capitata) began attacking peppers in June, causing severe damage to all plantings. High populations of MELON APHID (Aphis gossypii) and Aphis sp. caused severe damage to watermelons in all cultivated areas of Tripolitania.

Other Field Crop Insects

A PYRALID (Phycita diaphana probably) defoliated castorbeans in many areas. Light infestations of a CUTWORM (Agrotis segetum) and very heavy infestations of POTATO TUBERWORM (Gnorimoschema operculella) were recorded on tobacco.

Forest and Ornamental Insects

OLEANDER APHID (Aphis nerii) was quite heavy on oleander plantings around Tripoli. SWEETPOTATO WHITEFLY (Bemisia tabaci) did some damage to poinsettias. A LYMANTRIID was very heavy again this year on Acacia horrida, completely defoliating the trees. ROSE APHID (Macrosiphum rosae) was quite heavy on roses. The APHIDS (Cinara sp. and Eulachnus tuberculostemmata) were found on pine trees in Tripoli. (Last three aphids det. L.M. Russell).

Stored - Product Insects

MEDITERRANEAN FLOUR MOTH (Anagasta kuhniella), GRANARY WEEVIL (Sitophilus granarius), RICE WEEVIL (S. oryzae), LESSER GRAIN BORER (Rhyzopertha dominica), CONFUSED FLOUR BEETLE (Tribolium confusum), RED FLOUR BEETLE (T. castaneum), YELLOW MEALWORM (Tenebrio molitor), CADELLE (Tenebrioides mauritanicus), SAW-TOOTHED GRAIN BEETLE (Oryzaephilus surinamensis) and ANGOUMOIS GRAIN MOTH (Sitotroga cerealella) were found infesting stored grains at varying degrees of infestation.

Beneficial Insects

A BRACONID (Ecpylus sp.) was reared from a scolytid on olives. The following parasites were reared from Pieris rapae: A BRACONID (Apanteles glomeratus), a CHALCIDID (Brachymeria femorata) and a PTEROMALID (Pteromalus puparum). (All these parasites det. C.F.W. Muesebeck and B.D. Burks).

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SUMMARY OF INSECT CONDITIONS - 1961

SUDAN

By Arthur Kaatz*

Cereal and Forage Insects

There are two DESERT LOCUST (Schistocerca gregaria) seasons in Sudan. The winter season of November through March in the Red Sea Hills coastal area, and the summer season of June to October in a wide belt across north central Sudan. Infestations in the Winter Range were light in the southern part with numerous swarms spread out in the Port Sudan-Suakin region and scattered swarms from there on north to the northern borders. Breeding was fairly heavy along the coast north of Port Sudan but all hatches were controlled in the hopper stage. In the Summer Range the infestations were relatively light beginning in June in the Northern, Khartoum, Kordofan, and Darfur Provinces. More swarms appeared from the northeast in July with some egg laying in the Northern Province. Only a few swarms appeared during August, but 14 hopper hatches were recorded and successfully controlled. Numerous swarm movements were recorded in September with some scattered

* in cooperation with the Plant Protection Division, Sudan Ministry of Agriculture.

egglaying and hopper hatching in the Northern Province only during the last half of the month. All hopper hatches were destroyed. The infestation was light this year with a total of 143 swarms recorded. Hopper hatching was limited to the Northern and Khartoum Provinces.

TREE LOCUST (Anacridium moestum) was present in local areas of the Blue Nile, Khartoum, Kordofan, and Darfur Provinces from January through April, appeared again in the Darfur Province in August and September, and along the White Nile South of Khartoum in October. Control activities in the gum arabic forests last spring controlled most of the tree locusts. Spray operations are again being carried out in (November) all infested areas near the cotton schemes, some of which were invaded but without serious damage. TROPICAL MIGRATORY LOCUST (Locusta migratoria migratorioides), not seen since the summer of 1958, appeared during October in the durra fields of the Gebel Dali district of south central Sudan. Infestation varied from field to field over a wide expanse of area. Prompt spray operations controlled them without much serious damage.

DURRA STEM BORER (Sesamia cretica) was widespread in durra (sorghum) fields. Sugarcane in the Blue Nile Province was heavily infested, however, no control measures were carried out. A NOCTUID (Heliothis sp. probably armigera) infested durra heads in the milk stage in fields at Suki during September. Approximately 30 percent of the grains in some fields were seriously damaged before the infestation was controlled. Bean crops along the Nile River to the North were also infested early in the season but damage was intermittent. BEET ARMYWORM (Spodoptera exigua) caused the loss of one cutting of berseem at Shendi Schemes but was generally light in most of the rest of Northern Sudan. An APHID (Aphis sacchari)* was present on durra in the Managil Extension very early in the year. DURRA APHIDS (Aphis sorghi) were reported but attacks were very light in Central Sudan. APHIDS in pulse crops ruined some fields in the Northern Province. Severe attacks on pulse crops were recorded from areas in Equatoria Province. A WHITEFLY was heavy in pulse crops in the Khasim El Ghirba scheme and in several other widely spaced regions in Northern Sudan. CHAFERS were reported attacking all pulse crops in the Maridi District, being severe on cowpeas. EGYPTIAN COTTONWORM (Prodenia litura) ruined a number of broadbean fields in the Northern Province along the Nile during January before being brought under control by spraying. SPOTTED ALFALFA APHID (Theroaphis maculata)* and Aphis craccivora* were present in many berseem fields along the Nile River north from

* Identified by USDA or USNM specialist.

Khartoum during February and March. Many parasitized aphids were found and the parasites apparently kept the infestation in check as no damage was reported.

GRASSHOPPERS were general in all cultivated areas but little damage was reported except in Khasim El Ghirba where bean fields were sprayed. SUDAN PLAGUE GRASSHOPPER (Aiolopus savignyi) was seen in Blue Nile areas but was very light. A COTTON STAINER (Dysdercus superstiosus) and a FLEA BEETLE caused some damage to kenaf trials near Tonj. THRIPS damaged peanuts in the Gedarif area.

Cotton Insects

COTTON JASSID (Emoasca lybica) is the most important cotton insect pest in the Sudan. In 1961 the Gezira attacks were found in pockets and were initially high. In the Blue Nile and White Nile River regions attacks were sporadic and high in some local areas only. The Gash and Tokar regions were not affected. The infestation became widespread the latter part of September. Spraying operations, still in progress in November, have successfully controlled the jassid to where almost no damage to the crop has occurred. The total acreage sprayed will amount to about one million acres by the end of the season. SWEETPOTATO WHITEFLY (Bemisia tabaci) is the second most important cotton insect.

Initial attacks were high in localized areas of the Gezira, Blue Nile, and White Nile regions. No damage has resulted from this pest due to successful spraying operations carried out in conjunction with jassid control. A heavy attack in June on early cotton in the Shendi District was controlled when about 2000 acres were sprayed. COTTON APHID (Aphis gossypii) was present in small numbers in several areas of Equatoria and in the Gedarif area. Several fields near Kosti were successfully sprayed for the insect. COTTON THRIPS (Hercothrips fumipennis) damage was reported in the Sennar district only where several fields were sprayed. A FLEA BEETLE (Podagrion puncticollis) damaged about 5000 acres of seedling cotton in the Gedarif district; 300 acres had to be replanted. Attacks were very light in the Gezira and Blue Nile regions.

Spraying operations carried out simultaneously with survey from July to September in the Nuba Mountains controlled COTTON STAINERS (Dysdercus sp.) which were serious in local areas. Damage has been very light. Only a trace of EGYPTIAN COTTONWORM (Prodenia litura) was found in the Abdel Magid Scheme and near Gedarif. COTTON SEEDBUG (Oxycarenus hyalinipennis) was reported from Yambio and Nzara but has been a problem only in the cotton breeding plots at Shambat. TERMITES slightly damaged about 300 acres in the Gedarif area. Light attacks of TREE LOCUST (Anacridium moestum)

occurred in several cotton fields along the White Nile River during October. BEET ARMYWORM (Spodoptera exigua) destroyed approximately 260 acres of cotton at Tokar. Several other fields in area were also severely damaged.

COTTON LEAF ROLLER (Sylepta derogata) increased over last year in the Nuba Mountains. COTTON STEM BORER (Sphenoptera gossypii) was reported in the Gash River delta and at Nzara in Equatoria. A MIRID (Helopeltis sp.) caused slight damage at Yambio and at Nzara. RED BOLLWORM (Diparopsis watersi) was present in Equatoria, the Gash River area, and the Nuba Mountains. Clean cultivation and destruction of all trash plus flooding in the Gash River area have kept this bollworm in check. SPINY BOLLWORM (Earias insulana) was present at Yambio, Gedarif, and at Shambat, but was held in check by clean cultivation. No PINK BOLLWORM (Pectinophora gossypiella) damage has been reported this season except at Shambat and at Yambio. This is a late season insect in the Sudan and damage may still occur in late December and January. Heat treatment of all seed and clean culture help keep it under control. Slight attacks of OLD WORLD BOLLWORM (Heliothis armigera) were reported at Gedarif and Yambio. During late October and early November several fringe areas of Sennar, Kosti, and Duem Districts reported heavy attacks with up to 15 percent of bolls damaged in several fields. Usually damage is less than 5 percent. Some heavy boll shedding was reported in other fields. These schemes were all sprayed and bollworm incidence dropped to 1 percent or less. The heavy infestation was limited to the fringe areas where clean cultivation methods may have been lax.

Citrus and Other Fruit Insects

GUAVA FRUIT FLY (Pardalaspis quinaria) was again serious in most of the guava fruit and in some citrus in the Northern Province. Control activities were conducted along the Nile River. SCALE INSECTS on citrus were reported from many parts of the Sudan. Mango trees in the Northern Province were sprayed to control a SCALE (Lepidosaphes tapleyi)* and SPIDER MITES. BLACK APHIDS were common in all citrus regions with heavy infestations in Kassala Province early in the year. These were sprayed. GRASS-HOPPERS attacking young lemon trees in the Khasim El Ghirba district, were also controlled by spraying. A LEAF MINER in citrus caused some damage in the Northern and Kassala Provinces. Several schemes were sprayed for control. Light attacks of MEALYBUGS were found on pineapples in Equatoria Province, and on citrus in the Blue Nile Province. A TERMITE (Odontotermes sudanensis)* infested date palms in the Dongola/Merowe District, seriously attacking about 35 percent of the palms. About 200,000 palm were sprayed to control this termite. Also found on date palms in this district was the PARLATORIA DATE SCALE (Parlatoria

blanchardi) but attacks were light. A WHITEFLY (Siphonimus granati)* was found on pomegranates at Kassala. THrips injury was reported on lemon fruit in Equatoria Province. HAWKMOTH larva damaged several small grape plots in the Khartoum area.

Vegetable Insects

BLISTER BEETLES (Mylabris sp.) severe on peas and beans, RED BEETLE (Raphidopalpa foveicollis)* on beans and cucurbits, a PENTATOMID (Agonoscelis versicolor)* on beans and cucurbits, and a FRUIT FLY (Dacus sp.) on cucurbit fruits all caused considerable damage and were the most serious vegetable pests. In the Northern Sudan the PENTATOMID (Aspongopus viduatus)* attacked many melon and other cucurbit fields. TERMITES (Macrotermes herus* and Odontotermes sudanicus)* were serious pests in the Khasim El Ghirba District on peanuts. FLEA BEETLES and OLD WORLD BOLLWORM (Heliothis armigera) severely attacked okra in many places. Other species reported included SWEETPOTATO WEEVIL (Cylas puncticollis) on sweetpotato, TWELVE-SPOTTED MELON BEETLE (Epilachna chrysomelina)* on cucurbits and RED-BANDED THrips (Selenothrips rubrocinctus)* on beans.

Stored Products Insects

KHAPRA BEETLE (Trogoderma granarium) is the most important insect pest in Sudan from an International aspect and is present in much of the country. RICE WEEVIL (Sitophilus oryza), LESSER GRAIN BORER (Rhyzopertha dominica), RICE MOTH (Corcyra cephalonica), CONFUSED FLOUR BEETLE (Tribolium confusum), and RED FLOUR BEETLE (T. castaneum) were found in varying degrees in most places grains and cereals are stored. Also present in many districts were CADELLE (Tenebroides mauritanicus) and ANGOUMOIS GRAIN MOTH (Sitotroga cerealella). A weevil (unidentified) has been reported infesting stored tobacco bales.

Castorbean Insects

WHITEFLIES, GRASSHOPPERS, A STEM BORER (Sphenoptera (Tropiopeltis) falgeus), A SPIDER MITE (Eutetranychus orientalis), A LEAFHOPPER (Erythroneura sp.), LIMA-BEAN POD BORER (Etiella zinckenella), A ARMYWORMS (Spodoptera exigua and Prodenia litura), NOCTUIDS (Grammodes congenitalis and G. geometrica), and (Achaea catella) were all reported on castorbeans in the Gash Delta. Of these A. catella and Grammodes geometrica were the most abundant and caused damage to volunteer castor. During September a PHORID (Megaselia sp.)* and a CHALCID (Brachymeria euploaeae)* were found in great numbers parasitizing A. catella and Grammodes sp. Apparently this kept the infestation from developing further and only very light damage was caused. GRASSHOPPERS near Aroma were baited to prevent damage to castorbeans. Several hundred acres on the Aliab Scheme were severely attacked by unidentified

caterpillars (probably Achaea catella), and at the Hodeiba Scheme another 200 acres had to be replanted due to caterpillar damage.

Coffee Insects

Light attacks of the COFFEE BERRY BORER (Stephanoderes hampei) were reported in many of the older coffee plantations of Equatoria Province but none in the newer plantings. A LEAF SKELETONIZER, probably Epiplema sp., was reported in several plantations but caused no serious damage.

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SUMMARY OF INSECT CONDITIONS - 1961

TURKEY

By F. M. Philips

Cereal and Forage Insects

DESERT LOCUST (Schistocerca gregaria), ITALIAN LOCUST (Calliptamus italicus) and MOROCCAN LOCUST (Dociostaurus moroccanus) were reportedly light to nonexistent this year in southeastern Turkey. SENN PEST (Eurygaster integriceps) was reported as light to moderate in wheat in the eastern Anatolian Plains but infestations did not generally warrant control in 1961. Estimated loss ran from 1.2 to 2.5 percent. Aelia spp. were heavy enough to require control on about 38,000 hect. of small grains. An ARMYWORM (Prodenia sp.), EUROPEAN CORN BORER (Ostrinia nubilalis), and CORN EARWORM (Heliothis armigera) were heavy in the Adana Plains area. A CUTWORM (Agrotis sp.) caused moderate damage to grain crops in the Black Sea area.

Fruit Insects

CODLING MOTH (Carpocapsa pomonella) caused heavy damage in the Konya area and light to moderate damage in the Bursa-Gemlik area. MEDITERRANEAN FRUIT FLY (Ceratitis capitata) reportedly caused about 15 percent infestation in the citrus crop on the Mediterranean Coast. A SPIDER MITE (Tetranychus sp.) caused light to moderate damage in the Konya, Bursa, and Istanbul areas. Two SCALES INSECTS (probably Florida red scale and yellow scale) caused some damage to citrus in the Adana Plains area. LESSER ERMINE MOTH (Hyponomeuta sp.) reportedly caused light damage in most fruit growing areas of Turkey. OLIVE FRUIT FLY (Dacus oleae) and OLIVE FRUIT MOTH (Prays sp.) were heavy on olives in the

Bursa area. Light populations of PEAR LACE BUG (Stephanitis pyri)* were noted on apple at Edirne in May.

Cotton Insects

SPINY BOLLWORM (Earias insulana) was reported as light on cotton in the Adana Plains area. PINK BOLLWORM (Pectinophora gossypiella) reportedly caused 4-5 percent damage to cotton along the Mediterranean Coast. OLD WORLD BOLLWORM (Heliothis armigera) caused some localized heavy damage to the cotton crop in the Adana Plains area.

Miscellaneous Pests

A SCALE INSECT (Pulvinaria sp.) caused moderate damage on tea in the Black Sea area. THrips were moderate to heavy on tobacco along the Black Sea coast. Two SCALE INSECTS (Aonidia lauri* and Coccus hesperidum*) were very heavy and damaging on ornamental Laurus trees in Istanbul. A disease, TOBACCO BLUE MOLD (Peronospora tabacina) was heavy in Thrace causing the Plant Protection officials to destroy the entire crop. APHIDS were heavy on most truck crops in Adana, Izmir and Istanbul areas.

* Identified by USDA or USNM specialist.

Table 1

RICP AERIAL SPRAY DEMONSTRATIONS - 1961 - LIBYA

Pest	Date & Location	Crop	Amount Treated : Acres : Trees	Insecticide Actual Dosage	Control Results and Remarks
Alfalfa weevil	*3/18 : Garbulli, local	*Alfalfa	30 : 1.5 lbs/acre : TM/A = 2 gals.	: Toxaphene E.C. : 1.5 lbs/acre : TM/A = 2 gals.	: Estimated 50% control
Alfalfa weevil	*3/28 : Garbulli, local	*Alfalfa	15 : 25 lb/acre : TM/A = 4 gals.	: Endrin E.C. : 25 lb/acre : TM/A = 4 gals.	: Actual 98% control
Olive fruit fly	*7/22 : *8/27 : **9/26	*Olives	12.83 : 348 : 393 c.c./acre : TM/A = 4 gals.	: Lebaycid EC : 393 c.c./acre : TM/A = 4 gals.	: Final check 10/24 : Unsprayed: 49% attacked : Sprayed: 6% attacked : Actual 88% + control
	: M. Cotts farm: 23 km. west of Tripoli				
Olive fruit fly		*Olives	13.4 : 364 : Rogor EC		: Final check 10/24
		**Olives	13.4 : 364 : .815 lb/acre : TM/A = 4 gals.		: Unsprayed: 19% attacked : Sprayed: 12% attacked : Actual 76% + control
Olive fruit fly		*Olives	5.55 : 150 : Diazinon EC		: Final check 9/23
		**Olives	5.55 : 150 : .885 lb/acre : TM/A = 4 gals.		: Unsprayed: 49% attacked : Sprayed: 49% attacked : Actual 00% control
Olive fruit fly		***Olives	5.55 : 150 : Rogor EC		: Final check 10/24
					: Unsprayed: 49% attacked : Sprayed: 28% attacked : Actual 40% + control

Table 1 (Continued)

RICP AERIAL SPRAY DEMONSTRATIONS - 1961 - LIBYA

Pest	Date & Location	Crop	Amount Treated	Insecticide	Control Results
		Acres	Trees	Actual Dosage	and Remarks
Olive fruit fly	*8/25	*Olives	68.8	1400	Lebaycid EC :Final check 10/31
	*9/30	*Olives	70.7	1440	:395 c.c./acre :Unsprayed:47% attacked
	Veroli farm, 2 km. east of Sorman				:TM/A = 4 gals.:Sprayed: 7% attacked :Actual 85% + control
Olive fruit fly	*8/12	*Olives	30	1000	:Final check 10/26
	*8/15	*Olives	30	1000	:Unsprayed:71% attacked
	*9/12				:Sprayed: 24% attacked
	Habib farm, 2 km. east of Zavia	*Olives	60	2000	:815 lb/acre :Actual 66% + control :TM/A = 4 gals.:
Reported: Blue Mold	*7/26	*Tobacco	14.82	Zineb WP	
	*8/11				:3.58 lbs/acres:Results not available
	1 km. south of El Aziza				:TM/A = 4 gals.:
Reported: Blue Mold		*Tobacco	14.82	Crittox WP	
					:3.58 lbs/acre :Results not available
					:TM/A = 4 gals.:
Med. fruit fly	*9/18				
	*10/4	*Oranges,	53.6	6780	:Malathion WP :Final checks not :Lemons
	*10/19				:50 lb/acre :Completed 12/31/61
	*11/7	Grapefruit			:2 lbs. Protein
	*11/18	*Tangerine	5.56	1000	:Hydrolysat :Final checks not :TM/A = 2 gals.:Completed 12/31/61

(Continued)

Table 1 (continued)

BTCP AERIAL SPRAY DEMONSTRATIONS - 1961 - LIBYA

Pest	Date & Location	Crop	Acres:	Amount Treated:	Insecticide	Control Results and Remarks
Med. Fruit Fly	Veroli farm 2 km. east of Sorman	***Oranges, ***Grapefr. ***Citrus ***Tangerine ***Citrus ***Citrus	53.6	6780	Malathion WP .: 50 lb/acre :1 lb. Protein	Final checks not completed 12/31/61
					Hydrolysate /acre	Final checks not completed 12/31/61
					TM/A = 2 gals.	
		***Oranges Lemons Grape- fruit	53.6	6780	Malathion EC .: 50 lb/acre :1 lb. Protein	Final checks not completed 12/31/61
					Hydrolysate /acre	Final checks not completed 12/31/61
		***Tange- rines	5.56	1000	TM/A = 2 gals.	Final checks not completed 12/31/61

Total Trees 47,614 Treated, (Including repeat applications)
 Total Acres 699 Treated, (Including repeat applications)

Application: *(1st) ** (2nd) *** (3rd) **** (4th) ***** (5th)

TM/A = Total Mixture applied per acre

Note: On olives the unsprayed check did not include olives that had dropped.

Table 2

IRAN MINISTRY OF AGRICULTURE - 1961
AERIAL SPRAY PROGRAM

Pest	Date & Location	Crop	Area Treated Hect.	Actual Trees Hect.	Insecticide	Actual Dosage
Desert locust	January-June Shiraz	Range and Field crops	37,444*	37,444	Aldrin	120 gr./hectare
	Khuzestan		32,550	32,550	"	"
	Bander Abbas		1,730	1,730	"	"
<u>Heliothis armiger</u>	June-August Ra				Toxaphene 2.5 kilo/ha.	
<u>Farias insulana</u>	Gorgan Khuzestan	Cotton " " " "	7,495 873	7,495 873	DDT - 5-2 kilo/hect. Enderin 250 gr/hect.	
Moroccan locust	May-June Moghan	Range & Field crops	18,110	18,110	Aldrin 120 gr/hect.	
Senn pest	May-June Varamin Karaj	Wheat	10,400	10,400	Dipterex .85k.p/hect. DDT - 5 kilos/hect. Malathion 1 kilo/hect.	

Total - 98,385 hectares

* 1 hectare = 2.47 acres
1 kilos = 2.2 pounds

Table 3

RICP DEMONSTRATIONS - 1961 - AFGHANISTAN

Pest	Date & Location	Crop	Amount Treated: Acres	Insecticide: Trees	Actual Dosage	Control Results and Remarks
Baluchistan melon fly and Baris sp. weevil	June 15 Nad-i-Ali	Melons	5	Mallathion 50% 1½ lbs - 100 gal.	Malathion 50% 1½ lbs - 100 gal.	Results undetermined: as crops already heavily infested; work chiefly for demonstration and training.
"	June 16 Darweshan	Melons	5	"	"	
	June 13 and 14 Marja (2 Dems.)	Melons	15	"	"	
Scarabaeid larvae in soil	Sept. 12 Kabul	Fruit nursery stock	5	Aldrin - 2#/acre in soil	Too recent to give control.	
Spiny bollworm	July Kandahar	Cotton	1	DDT dust 10% 15 lbs/acre	75-80%	
Stored grain pest	Sept. Kabul	Wheat storage ware-houses	7	Malathion 50% 20cc - 10 lit.	To clean up for storing new wheat.	
Local grass-hoppers	May 27 Kandahar	Wheat	40	BHC Dust	Estimated 90%	
		Total:	71			

Table 3 (Continued)

FTCP DEMONSTRATIONS in 1952 in ETHIOPIA

Peru	Date & Location	Crop	Urgent Insect	Insecticide	Actual Doseage	Control result and Remarks
<u>Coccus hesperidum</u>	12-26-60 Guder	Citrus		400	Summer oil, 1 g./100 g. H ₂ O	25% control
<u>Papilio demoleus</u> <u>v. demodocus</u>	12-28-60 Baco	Citrus		200	Malathion 1 lb./A	100%
<u>Papilio demoleus</u> <u>v. demodocus</u> and <u>Coccus hesperidum</u>	5-18-61 Nazareth	Citrus		100	Malathion 50% EC 100 cc plus Summer oil 90cc/5 g. H ₂ O	100% on <u>Papilio</u> 25% on <u>Coccus</u>
<u>Tcerya purchasi</u>	5-27-61 Nazareth	Citrus		720	Summer oil 1 g./100 g. H ₂ O	Not effective
<u>Tcerya purchasi</u>	6-20-61 Addis Ababa	Citrus		9	Mal. 50% EC 100 cc Summer oil 90 cc sto 5 g. H ₂ O	No check
<u>Sitophilus oryzae</u>	2-15-61 Shashamani	Stored Grain		3	Phostoxin 10 tab./T	100%
<u>Sitophilus oryzae</u>	5-31-61 Wonji	Shelled corn		5.5	Phostoxin 10 tab/T	100%
"	" 5-31-61 Wonji	Chick peas		6.5	" " "	100%
"	" 6-19-61 Dilla	Shelled corn		1	" " "	100%

Table 3 (Continued)

RICP DEMONSTRATIONS - 1961 - ETHIOPIA

61

Pest	Date & Location	Crop	Amount Treated Lt.*	Treated Acres	Insecticide Actual Dosage	Results and Remarks
<u><i>Sitophilus oryzae</i></u>	6-19-61 Dilla	Shelled corn	2	"	Phostoxin 10 tab/T	100%
"	6-21-61 Dilla	Wheat	3	"	"	100%
"	6-23-61 Dilla	Shelled corn	3	"	"	100%
"	7-1-61	Sorghum	2	"	"	100%
"	7-7-61 Ambo	Sorghum	10	"	"	100%
Larvae in stems	12-30-60 Debre Zeit	Onions	.10	Lindane 1 lb/A	No control	
<u><i>Brevicoryne brassicae</i></u>	4-19-61 Addis Ababa	Cabbage	.02	Malathion 2.25 lb./A	100% (dosage excessive)	
Termites	5-15-61 Menagasha	Potatoes	.15	Dieldrin 50% WP	2 lbs. used in nests scattered over field. No check	
Cutworm	5-61 Debre Zeit	Peppers	.01	DDT 2 lb./A.	100%	
<u><i>Chrysomya putoria</i></u> (calliphorid fly)	8-17-61 Nazareth	Grapes	.3	Malathion bait spray	Owner reported harvesting a good crop	

Table 3 (Continued)

RICP DEMONSTRATIONS - 1961 - ETHIOPIA

Pest	Date & Location	Crop	Amount Treated : Lt.* : Trees	Insecticide : Actual Dosage	Control Results : and Remarks
Phycitidae	8-22-61 Debre Zeit	Chat		.07	Malathion 1 lb/A : 100%
Leafhoppers	10-6 to 19-61 Ghible	Cotton	70	Malathion .5 lb/A : 100% reported by technician.	
Spodoptera exempta	10-17-61 Teji	Teff		.15	DDT .5 lb/A : 100%
"	10-27-61 Teji	Teff		.2	DDT 1.7 lb/A : 100%
"	10-31-61 Sebeta	Teff		.05	" " " 100%
"	10-31-61 Teji	Teff		.3	" " " 100%
"	11-10-61 Hagere Hiot	Teff, noug, chick peas		.3	" " " 100%
"	11-17-61 Addis Alem & Gheda	Teff		.3	" " " 100%
"	11-20-61 Gambela	Corn		.5	" " " 100%
"	11-21-61 Gambela	Corn	15	" " " 100%	

62

Total Trees: 1429
Total tons : 36
Total Acres: 87.80

* Lt. indicates long tons

Table 3 (continued)

RICK DEMONSTRATIONS - 1961 - LIBYA

Table 3 (Continued)

RICP DEMONSTRATIONS - 1961 - LIBYA

Pest	Date & Location	Crop	Amount Treated : Acres	Insecticide : Trees	Actual Dosage	Control Results : and Remarks
<u>Tetranychus telarius</u>	April: Swanni Ben Adem	Citrus	154 : 154	Kelthane 18.5% W.P.	100%	
				250 gms / 50 gms.		
				Triton B-1956 to		
				100 lts. water		
				Kelthane 18.5% E.C.	100%	
				125 gms. / 50 gms.		
				Triton B-1956 to		
				100 lts. water		
				Tedion 18% E.C.	100%	
				200 gms. / 50 gms.		
				Triton B-1956 to		
				100 lts. water		

Total Trees: 15,154
 Total Acres: 1,375

Table 3 (Continued)

RICP DEMONSTRATIONS - 1961 - SUDAN

Pest	Date & Location	Crop	Amount Treated : Acres : Trees	Insecticide Actual Dosage	Control Results and Remarks
Black aphids	February : Khartoum	Citrus	20 : 20	Rogor 0.35 lb/A.	100%
Spider mites	February : Khartoum	Mango	20 : 20	Rogor 0.35 lb/A.	99%
A scale insect	April : Khartoum	Mango	20 : 20	Ekatin 0.25 lb/A.	90%
Termites	May-June : Domgola/Merowe	Date palms	2000 : 2000	Aldrin 2 lb/A.	99%
A whitefly	May : Khasimel Ghirba	Kenaf	0.5 : 20	Malathion 1.3 lb/A. "	100%
Termites	" : "	Lubia	" : 30	" : Aldrin 2 lb/A.	99%
Grasshoppers	June : Khasim El Ghirba	Citrus	100 : 100	BHC 0.1 lb/A.	99%
A scale insect	June : Khartoum	Lubia	20 : 20	BHC 0.1 lb/A.	
Termites	August : Khartoum North	Jasmine	10 : 10	Dimecron 0.25 lb/A.	50%
Blister beetle	September : Khartoum	Wood	House : Bushes:	Thiodan 25% paste	100%
Grasshopper	" : "	" : "	" : "	" : "	
Leafhopper	" : "	" : "	" : "	" : "	
Plant bugs	" : "	" : "	" : "	" : "	

Table 3 (Continued)

RTCP DEMONSTRATIONS - 1961 - SUDAN

		Date & Location	Crop	Amount Treated : Acres : Trees	Insecticide Actual Dosage	Control Results : and Remarks
Pest						
A Scale insect	September	Jasmine		10	Malathion 1.3 lb/A.	95%
	Khartoum					
A Whitefly	September	Castorbean	0.1		Malathion 1 lb/A.	50%
Leafhoppers	Kassala					
Caterpillars						
"	"	"	0.1			
"	"	"	0.1		Dieldrin 0.9 lb/A.	80% whitefly no control
"	"	"	0.1			
Grasshoppers	September	Castorbean	100		BHC	1.3 lb/A. 100%
	Kassala					
A Whitefly & Jassids	October	Cotton	185		Dimecron 0.25 lb/A.	98%
	Abu Guta					
		(In cooperation with CIBA LTD.)				
Hawkmoth Larvae	October	Sweetpotato	5		Dimecron 0.25 lb/A.	100%
	Maridi					
		(In cooperation with Agriculture Extension)				
**Complex	October	Pulses	0.02		Tobacco juice 1b/A.	
	Yei				Home made	

Table 3 (Continued)

RTCP DEMONSTRATIONS - 1961 - SUDAN

Pest	Date & Location	Crop	Amount Treated	Insecticide	Control Results
		Acres	Trees	Actual Dosage	and Remarks
Complex	October Yei	pulses	0.02	Malathion 1.3 lb/A.	?
"	"	"	0.02	Dimecron 0.25 lb/A.	?
"	"	5 vegetab- les	0.02	Home made Tobacco juice	?
"	"	"	0.02	Malathion 1.3 lb/A.	?
Melon insects		Sweetpotato	0.1	Dimecron 0.25 lb/A.	?
Leafhopper					
Grasshopper					
Black aphids & A scale		Citrus	20	Malathion 1.3 lb/A.	?

(All at Yei in:cooperation with Horticulture Advisor)

Total Trees: 180
Total Acres: 2361

* Complex of flea beetles, aphids, grasshoppers, leafhoppers, melon insects.

Table 4

MINISTRY OF AGRICULTURE DEMONSTRATIONS - 1961 - AFGHANISTAN.

Pest	Date & Location	Crop	Amount Treated	Insecticide	Control Results
		Acres	Trees	Actual Dosage	and Remarks
Mildew	March Corizz-i-Mir	Grapes	35,000	Lime - sulfur 10% dormant wash	Reported 75-85% control
Mite and Aphid eggs	March Corizz-i-Mir	Fruit trees	10,000	Dinitro cresol (DNOC)	" "
Mildew	March Herat	Grapes	25,000	Lime - sulfur 10% dormant wash	" "
Codling moth & aphids	May Corizz-i-Mir	Fruit trees	10,000	Malathion 50% 10 c.c. - 10 litters	Codling moth - 30-50% control Aphids = 90% control
Red mite	June Corizz-i-Mir	"	"	Metasystox 8c.c. - 10 liters	80-90% control
Codling moth & aphids	June Corizz-i-Mir	"	"	Malathion 50% 10c.c. - 10 litters	Codling moth = 30-50% control Aphids = 90%
Codling moth & aphids	July Corizz-i-Mir	"	"	Malathion 50% 10c.c. - 10 litters	Codling moth = 30-50% control Aphids = 90%
Codling moth & aphids	June-July 1 & 2 Kabul applica-	Fruit trees	15,000	Malathion 50% 10/10 DDT 75%WP-2½#/100 gal.	Codling moth = 50% control Aphids = 90%
Diaphorina citri	June 12 Jalalabad	Citrus	500	DDT - 75% WP 1½ lbs/100 gal.	Results poor; no control

Table 4 (Continued)

MINISTRY OF AGRICULTURE DEMONSTRATIONS - 1961 - AFGHANISTAN

Pest	Date & Location	Crop	Amount Treated	Insecticide	Control Results
			Acres:	Trees	and Remarks
			Vines		
<u>Malacosoma & Hyponomeuta</u>	June-July Kataghan Apps.	Several trees	20,000	DDT..75% WP 2½ lbs/100 gal. Malathion 50% 10/lQ	DDT - 70% Malathion - 90%
Aphids	June-July Mazar-i-Sharif "	Almond & apple	15,000	Malathion 50% 10c.c. - 10 lit.	Reported 90%
Mildew	June-July 1 & 2 Herat appl.	Grapes	25,000	Sulfur dust	Reported 90%
Red melon beetle	August Herat	Melons	25	Folidol (Parathion) .05%	80% Reported control
Totals:			25	190,000	

Table 4 (Continued)

MINISTRY OF AGRICULTURE DEMONSTRATIONS - 1961 - IRAN *

Pest	Date & Location	Crop	Amount Treated Hect.	Insecticide ** Actual Dosage	Control Results and Remarks
Desert locust	Jan. - June Fars & Southern Iran	Range & F. crops:	374,707	120 gr. aldrin/ per hectare	
Moroccan locust	May - June Moghan	Range & field crops:	169,301	120 gr. aldrin per hectare	
Native grasshop- pers (<i>Dociosaurus</i> <i>Calliptamus</i> spp.)	May - July Throughout Iran	Range & field crops:	104,930	120 gr. aldrin per hectare	
Senn Pest	May - June Tehran, Isfahan, Kerman, Kermanshah, Meshed, Shiraz, Azerbaijan	Wheat	40,911	Diptrex - 850 gr. per hectare DDT - 5000 gr/hect. Malathion 1000 gr. per hectare	- 95% - 93% - 70%
Senn Pest	May - June Isfahan	Wheat	6,500	Biological control using parasites <i>Microphamanurus semis</i> - 85 - 90% <i>triatomatus</i> 10,000/hect.	
Spiny bollworm & <i>H. armigera</i>	June - August Gorgan, Azerbaijan Tehran, Khorasan	Cotton	25,127	Endrin 250 gr./h. Endrin 250 gr./h DDT 500 gr.-2000 gr: per hectare	90% 90% 90%
Stem borer (<i>Sesamia cretica</i>)	April Baluchistan & Sistan:	Maize	2,520	Endrin -500 gr/hect:	92%

Table 4 (Continued)

MINISTRY OF AGRICULTURE DEMONSTRATIONS - 1961 - IRAN

Pest	Date & Location	Crop	Amount Treated : Hect.	Insecticide	Control Results : and Remarks
General pests	April - July Rezaiyeh, Hamadan : fruits Tehran, Azerbaijan: Meshed	Deciduous	1886,777	Wide variation depending on pest and availability of pesticide	80%
General pests	April - May Gazvin, Kerman, Khorasan	Pistachio	2816,323	Depending on availability either malathion, or parathion or Diazinon & DDT	85%
Many different species of scales & mites	April - June Caspian area & Kerman	Citrus		Oleo parathion or Oleo folidol / Lime Sulfur	85-90%
Black scale	May - September Rudbar	Olive	250,000	Summer oil / Diazinon	90%
A fulgorid (Ommatissus binotatus)	Kerman	Dates	67,500	DDT	95%
A Mite (Oligonychus afraasiaticus)	Kerman	Dates	67,500	Lime Sulfur	75%
Total Trees : Total Hect. :	5,088,100 723,996				* Does not include operation for control of diseases or rodents ** One hectare - 2.47 acres One kilogram - 2.2 lbs.

Table 5

PLANT PEST CONTROL EQUIPMENT IMPORTED - 1961

<u>Article</u>	<u>Source & No.</u> <u>U. S. : Other</u>	<u>Agency Importing</u>		
		<u>USOM</u>	<u>Ministry</u>	<u>Other</u>
<u>AFGHANISTAN</u>				
Micro-pulverizing machine for preparation of talc	1		x	
Work jeeps	2		x	
Buffalo turbine blowers	2		x	
Hudson 50 gal. sprayer for tractor mounting	1		x	
Hudson multiple outlet duster for tractor mounting	1		x	
15-Gal. portable power sprayer	3			HVA Agri. USOM Project
35-Gal. power sprayer	1			"
Knapsack sprayers	10			"
Knapsack power duster	1			"
200-Gal. trailer-mounted power sprayers	2			"

NOTE: First 5 items above at Peshawar, Pakistan, awaiting border clearance for delivery Kabul.

IRAN

Power sprayer 150 lit.		25	x
" " 100 "		25	x
" " 100 "		25	x
" " 50 "	25		

Table 5 (Cont'd) PLANT PEST CONTROL EQUIPMENT IMPORTED - 1961

<u>Article</u>	<u>Source & No.</u> <u>U. S. : Other</u>	<u>Agency Importing</u>		
		<u>USOM</u>	<u>Ministry</u>	<u>Other</u>
<u>IRAN (Cont'd)</u>				
Exhaust sprayer	15		x	
Piper cub airplanes	5		x	
Jeep (Pick-up)	25		x	
Spare parts				
Jeep	3		x	
<u>LIBYA</u>				
Dodge Truck	2	(Wheelus AFB)	x	
Landrover	2		x	
Jeep	1	(Wheelus AFB)	x	
Wheelbarrow sprayers	125		x	
Micron sprayer	1			x
Motor sprayers: 100 lts.	1		x	
200 lts.	4		x	x
300 lts.	3		x	
400 lts.	1		x	
<u>SUDAN</u>				
Power applicator - Backpack	3		x	
Hand operated applicator - Backpack	10	x		
Trucks	14		x	
Tractors	5		x	
Power applicators	55		x	

Table 5 (Cont'd) PLANT PEST CONTROL EQUIPMENT IMPORTED - 1961

<u>Article</u>	<u>Source & No.</u> <u>U.S. : Other</u>	<u>Agency Importing</u>		
		<u>USOM</u>	<u>Ministry</u>	<u>Other</u>
<u>TURKEY</u>				
Power applicators	2,639			x
408 dusters				
2,221 sprayers				
Hand applicators	203	794		x
859 dusters				
138 sprayers				
Spray planes (Cessna) Cubs	15			x
Spare parts for spray planes	x			x
Spray equipment (Micronair) for planes	15			x

Table 6

PESTICIDES IMPORTED - 1961 - AFGHANISTAN

Insecticide (Formulation & Strength)	Imported from U.S.			Imported from Other Countries		
	USOM	Ministry	Other	USOM	Ministry	Other
	Gals.	Tons	Gals.	Tons	Gals.	Tons
BHC Dust	100					100
Malathion 50% EC	30					
Aldrin 40% EC	15					
Dieldrin 20% EC	15					
Total (Afghan.)	60	100			100	

Table 6 (Continued)

PESTICIDES IMPORTED - 1961 - ETHIOPIA

Insecticide (Formulation & Strength)	Imported from U.S.			Imported from Other Countries		
	USOM 100 Gals	Ministry 100 Tons	Jc/lnj-Fund 100 Gals	USOM 100 Tons	Ministry 100 Tons	Joint Fund 100 Gals. Tons
Dieldrin 50% WP	..	..	..	..	..	.15
Malathion 50% EC	..	..	..	..	5	
Malathion 25% WP	..	..	..	..	.20	
Summer Oil	1.750	..	..	..	..
DDT 25% EC	2.500	..	..	..	..
DDT 75% WP	1.35	..	..	..	..
Chlordane 25% EC	.025	..	..	..	..
Chlordane 50% WP	.15	..	..	..	..
Yeast Hydrolyzate	.025	..	..	..	..
BHC 16% gamma (Acrodel)	..	..	..	120	..	
Dieldrin 20% oil solution	..	..	..	24	..	
Total (Ethiopia)	4.300	1.50	..	144	5	.35

Table 6 (Continued)

PESTICIDES IMPORTED - 1961 - IRAN

Insecticide (Formulation & Strength)	Imported from U.S.			Imported from Other Countries			
	USOM	Ministry	Other	USOM	Ministry	Other	
Gals.	Tons	Gals.	Tons	Gals.	Tons	Gals.	Tons
Aldrin 40% EC							1.8
BHC 6.5% D							1.0
BHC 10% WP							
BHC 12% WP							14.6
DDT 10% D							
DDT 25% EC							
DDT 50% WP							
DDT 75% WP							
Dieldrin 20% Sol.							
Dieldrin 20% EC							
Dipterex 80% WP							
Endrin 18.4% EC							
Folidol 25% EC							
Gusathion 20% EC							
Lindane 20% EC							
Lindane 25% WD							

Table 6 (Continued)

PESTICIDES IMPORTED - 1961 - IRAN

Insecticide (Formulation & Strength)	Imported from U.S.			Imported from Other Countries		
	USOM	Ministry	Other	USOM	Ministry	Other
	Gals.	Tons	Gals.	Tons	Gals.	Tons
Lindane 50%		.5				
Lindane (Tech.)		.22				
Malathion 40% EC		1.4				
Malathion 50% EC					1.4	
Metasyston 25% EC					7.0	
Olev-Folidol				10.0		
Parathion 25% EC					32.2	
Toxaphene 60% EC					2.3	
Toxaphene & DDT 40% + 20% EC			5.			
Total (Iran)	50	54.0			240	207.00

Table 6 (Continued)

PESTICIDES IMPORTED - 1961 - LIBYA

Insecticide (Formulation & Strength)	Imported from U.S.			Imported from Other Countries			
	USOM	Ministry	Other	USOM	Ministry	Other	
Gals.	Tons	Gals.	Tons	Gals.	Tons	Gals.	Tons
Aldrin 24%				400			
Phostoxin				.25			
Gamexane W.P.							2.42
Cerazamma							2.20
Zineb							2.90
Mercuriogamma (disinfect.)				.12			
Malathion E.C.				488			
Sulfur W.P.							.44
Aldrin 6%				288			
Dieldrin 60% paste							.11
Super Ovoki (acaricide)							.22
Parathion 20%				180			
Snail Bait							1.21
White oil & parathion							2.58
White oil							.74

Table 6 (Continued)

PESTICIDES IMPORTED - 1961 - LIBYA

Table 6 (Continued)

PESTICIDES IMPORTED - 1961 - SUDAN

Insecticide (Formulation & Strength)	Imported from U.S.			Imported from Other Countries		
	USOM Ministry	Other	USOM Ministry	Other	Ministry	Other
Gals. Tons Gals. Tons Gals. Tons Gals. Tons Gals. Tons	100 100 100 100 100 100 100 100					
Aldrin	20	
*Asuntal	0.1	
BHC	230	670
Chlordane	10		
DDT	1620	..	..	507.5	400	
Diieldrin	35	40	
Dimecron	0.5	0.25	
Dipterex	5		
Ekatin	1	
Endrin	400	1950
Ethylen Dichloride- Carbontet	20	
Guthion	0.5
Malathion	1	..	..	..	..
Metassytox	7	25	

Table 6 (Continued)

PESTICIDES IMPORTED - 1961 - SUDAN

Insecticide (Formulation & Strength)	Imported from U.S.			Imported from Other Countries		
	USOM	Ministry	Other	USOM	Ministry	Other
	Gals.	Tons	Gals.	Tons	Gals.	Tons
	100	100	100	100	100	100
<u>Potassium cyanide</u>	..	..	..	..	2	..
<u>Rogor</u>	..	..	..	20	155	60
<u>Sevin</u>	..	..	..	1	1	1
<u>Thiodan</u>	..	..	..	0.25	0.05	..
<u>Toxaphene</u>	200	..	..	..	..	..
<u>Zectran</u>	0.5	..	..	..	..	..
<u>Zinc phosphide</u>	..	..	..	1	..	..
Total (Sudan)	1621.5	200				
				82		
					1000	254.25 2531.8 776.1

(* Asuntal = Chlorocoumarin thiophosphonic Acid Ester)

Table 6 (Continued)

PESTICIDES IMPORTED - 1961 - TURKEY

Insecticide (Formulation & Strength)	Imported from U.S.			Imported From Other Countries		
	USOM	Ministry	Other	USOM	Ministry	Other
Gals. Tons	Gals. Tons	Gals. Tons	Gals. Tons	Gals. Tons	Gals. Tons	Gals. Tons
Agrosan G.W.	1230					
Agrocid 7	100					
Anicon TM	8760					
Anticusculta		15.5				
BHC 13-14% dust		615				
BHC 50% dust	40					
Cotton dust						
3%DDT, 10%Tox, 40%Sul.	300					
Copper fungicide		21				
Copper-sandoz		45				
Copper sulfate		984				
Diazinon (Tech.)		5				
DDT (Tech.)	400					
Dipterex 50% WP		187				
Dithane Z-78		110				
Duphar Tediion V-18		24.2				

Table 6 (Continued)

PESTICIDES IMPORTED - 1961 - TURKEY

Insecticide (Formulation & Strength)	Imported from U.S.			Imported from Other Countries		
	USOM Gals.	Ministry Tons	Other Gals.	USOM Tons	Ministry Gals.	Other Tons
Ekatin	..	..	..	..	..	1
Endrin (Tech.)	6	..	..	..	..	..
Fernozone	..	..	..	..	6	..
Fosferno 20	..	..	..	..	8	..
Gusathion 20% EC	..	..	..	..	1.5	..
Heptachlor (Tech.)	5	..	..	..	..	..
Intox 8	..	..	..	1	..	..
Kumulus 80	..	..	..	..	70	..
Nicotox 20	..	..	..	..	0.5	..
Porkan	..	..	..	..	20	..
Pypytrine No. 44	..	..	..	..	..	11.2
Pyrenone 606 Spray	8.2	..	..	..	..	..
Sandolin A	..	..	..	..	5	..
Sevin 50% WP	..	..	..	..	..	7.5
Sulfur	150	..	..	..	..	..

Table 6 (Continued)

PESTICIDES IMPORTED - 1961 - TURKEY

Insecticide (Formulation & Strength)	Imported from U.S.			Imported from Other Countries								
	USOM	Ministry	Other	USOM	Ministry	Other						
	Gals.	Tons	Gals.	Tons	Gals.	Tons	Gals.	Tons	Gals.	Tons	Gals.	Tons
U-46 Cebetox 60 Ester	..	..	..	..	..	..	..	..	..	..	5	..
Volck 92	131	..	..	..	..	..	..	..	..	..	..	..
Lindane (Tech.)	..	..	..	..	..	..	..	..	..	..	1.2	..
Total (Turkey)	1000.2	..	..	..	..	..	..	..	..	..	12,329.6	..

Table 7 PLANT PROTECTION IN-SERVICE TRAINING - 1961

<u>Country</u>	<u>Type of Training</u>	<u>Date Locality</u>	<u>Number Trainees</u>	<u>Subject & Remarks</u>
<u>Lectures:</u>				
<u>AFGHANISTAN</u>	Extension Short course	2/12 Kabul	38	Cotton Insects
	" "	2/14 Kabul	38	Sugar beet insects
	" "	2/28 Kabul	35	Fruit insects
	Extension & Pl. Prot. sh. course	6/26 Kabul	20	Insect detec- tion & survey
	" "	6/27 Kabul	20	" "
	" "	6/26 Kabul	24	" "
	Pest control Demonstra- tion	7/13 Marja	20	Use of hand and portable power sprayers against Baluchistan melon fly
	" "	7/14 Marja	20	" " "
	" "	7/15 Nad-i-Ali	20	" " "
	" "	7/16 Darweshan	20	" " "
	" "	9/12 Kabul	10	Soil treatment for white grubs in nursery plots
<u>Total:</u>			<u>265</u>	

Table 7 (Cont'd) PLANT PROTECTION IN-SERVICE TRAINING - 1961

Country	Type of Training	Date Locality	Number Trainees	Subject & Remarks
<u>LIBYA</u>	Extension Training school	Tripoli Jan.	40	Pest control, insect survey, stored products, and collecting
	Horticultural Trainees	Wadi Caam	4	Pest control practices
	Total:		44	
<u>SUDAN</u>	Plant protection	Feb. Khartoum	10	Demonstration of sprayer
	Plant quarantine	Mar. Khartoum	35	Fumigation methods and chemicals
	Plant quarantine & insect control	Apr. Khartoum	75	Films on plant quarantine and insect control
	Plant protection	June 61 Khartoum	20	Weather as it affects desert locusts & operation of a meteorology station for locust control personnel
	Plant protection	Aug. Khartoum	5	Testing & use of hand operated sprayer
	Plant protection	Oct. Maridi	30	Insects of local crops
	Plant protection	Oct. Yei	8	Demonstrated use & operation of sprayer
	Plant protection	Nov, Khartoum	1	Insecticides & use in insect control
	Total:		204	

Table 7 (Cont'd) PLANT PROTECTION IN-SERVICE TRAINING - 1961

<u>Country</u>	<u>Type of Training</u>	<u>Date Locality</u>	<u>Number Trainees</u>	<u>Subject & Remarks</u>
<u>TURKEY</u>	Plant protection	9/27/61 Mersin	52	Spray schedule for medfly
	Total:		52	
<u>ETHIOPIA</u>	Extension. Insect control (farmers)	5-29-61 Majete	50	Lecture by Project technician
	Insect control (pl. prot. pers.)	9-21-61 Addis Ababa	25	Showed Med-fly film & discus- sion
	Insect survey (fac. & students)	10-13-61 Jimma	150	Film, slides & talk by Survey Specialist at Jimma School
	Insect survey (fac. & students)	10-17-61 Alemaya	200	Film, slides & talk by Survey Specialist at Alemaya Col.
	Insect survey (trainees)	10-7 to 28-61 Addis & field	10	Worked with Survey Specialist in lab. & field
	Insect control (farmers)	6-20-61 Dilla	50	Talk by Ministry technician.
	Total:		485	
<u>IRAN</u>	Insect survey (pl. prot. pers.)	June Tehran	20	Lectures, Demonstrations

Table 8 PILOT AND MECHANIC TRAINING - 1961

Country	Type Training	Number of Trainees	Duration of Training	Remarks
<u>LIBYA</u>	Pilot	1	1/1 - 9/15	Advanced training for Grade "3" International Pilot's license.
	Assistant mechanic	1	7/1 - 12/31	On the job training
	Total:	2		
<u>IRAN</u>	Nav. Trng. for pilots	12	2 months	Started Nov. 1, 1961
	Flying refresher for pilots	12	2 months	Started Nov. 1, 1961
	Total:	24		
<u>ETHIOPIA</u>	Pilot	2	1 month	Dropped out
	Pilot	2	4 months	Dropped out temporarily due to salary difficulties
	Total:	4		

Table 9

PARTICIPANT TRAINING - 1961

Origin	Name of Participant	Country to which sent	Duration of training	Type of training
<u>IRAN</u>	Abdol Ghafoor Mirzai	USA	12 months	Academic and field training in economic entomology
<u>LIBYA</u>	Abdul Majid Ben Saad	Tunisia	10 days	African insect work seminar
	Bashir Wafati	"	10 days	"
	Abdul Gadar Sharif	"	10 days	"
<u>SUDAN</u>	Said Ibrahim Said	USA	3½ months	USDA plant quarantine
	Lloyd George Tadros	Tunisia	10 days	Insect control seminar
	6 NATP participants*	Ethiopia	1 year	Pilot training
<u>TURKEY</u>	Iren	USA	12 months	Insects of deciduous fruits
	Kunter	USA	12 months	Cereal & forage crops
<u>ETHIOPIA</u>	Andemeskal Woldehaiminot	USA	1 year	Ent. (Special course)
	Yosef Bushen	USA	2 years	Ent. (M.S.)

* Sent in cooperation with Agriculture Engineering Project, USOM/Sudan.

Table 10

PLANT PEST CONTROL FUNDS - 1961

Breakdown of Expenditures	USOM Dollars	Ministry Dollar Equivalent
<u>AFGHANISTAN</u>		
Insect Control Project (Equipment)	\$14,000	
PL-480 Wheat Fund (local currency) Used to build new P.P. laboratory and office	\$57,000	
Regular Ministry P.P. budget and Plan budget		\$125,000
<hr/> Total:	\$71,000	\$125,000
<u>IRAN</u>		
Equipment		\$207,356.24
Insecticides		258,611.98
Operating costs (including erection of buildings, per- sonnel, rental, repairs, per diem, travel, labor costs local purchases, lab. equipment) administrative materials, etc.)		1,678,625.78
Special Activities Acct.	5,226	
<hr/> Total	5,226	\$2,144,594.00
<u>LIBYA</u>		
Offshore purchases	93,360	
Other costs	56,640	
Ministry		300,000
<hr/> Total:	\$150,000	\$300,000

Table 10 (Cont'd)

PLANT PEST CONTROL FUNDS - 1961

<u>Breakdown of Expenditures</u>	<u>USOM Dollars</u>	<u>Ministry Dollar Equivalent</u>
<u>MOROCCO</u>		
U.S. Loan for locust control	2,000,000	
		2,229,016
Total:	2,000,000	2,229,016
<u>SUDAN</u>		
Participants	4,390	-
Plant protection equipment	760	-
Insecticides	100	349,827
All other	4,500	1,820,173
Total:	\$ 9,750	\$ 2,170,000
<u>TURKEY</u>		
Equipment	5,000	571,186
Insecticides		1,703,756
Participant trainees	10,000	
Salaries and other expenses		2,274,942
Total:	.15,000	4,549,884
<u>ETHIOPIA</u>		
Joint Fund Pest Control Project	28,116.00	70,290.00
Ministry of Agriculture Locust Control Section	253,801.68	634,504.20
Total:	281,917.68	704,794.20

